INITIAL STUDY/
MITIGATED NEGATIVE DECLARATION

GRAPE SOLAR PROJECT AND GEN-TIE LINE

CUP 20-02

Kings County Community Development Agency

March 2021

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APPENDICES

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LIST OF TABLES

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LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

AADT	Annual Average Daily Traffic
AB 32	Assembly Bill 32 (California Global Warming Solutions Act of 2006)
AC	alternating current
ADA	Americans with Disabilities Act
ADT	Average Daily Traffic
AF or af	acre-feet
AFY or afy	acre-feet per year
AMP	Agricultural Management Plan
APN	Assessor's Parcel Number
BMPs	best management practices
CAISO	California Independent System Operator
CalGEM	California Department of Conservation (CDOC), Geologic Energy Management Division
CALGreen	California Green Building Standards Code
Caltrans	California Department of Transportation
CAP	Climate Action Plan
CARB	California Air Resources Board
CBC	California Building Code
CBSC	California Building Standards Commission
CDA	Community Development Agency
CDFW	California Department of Fish and Wildlife
CDPH	California Department of Public Health
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CGS	California Geological Survey
CNDDB	California Natural Diversity Data Base
CNEL	community noise equivalent level
CO2e	Carbon Dioxide Equivalents
CPUC	California Public Utilities Commission
CRHR	California Register of Historical Resources
CVP	Central Valley Project
CWA	Clean Water Act
CWML	Chemical Waste Management Landfill
cy	cubic yards
dB	decibels
dBA	decibels in "A-weighted" scale
DC	direct current
DOC	California Department of Conservation
DOC	Department of Defense
DPR	California Department of Pesticide Regulation
DSRP	Decommissioning and Soil Reclamation Plan
DTSC	California Department of Toxic Substances Control
DWR	California Department of Water Resources
EIR	Environmental Impact Report
ESA	Endangered Species Act

ACRONYMS AND ABBREVIATIONS (Cont'd)

FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FMMP	Farmland Mapping and Monitoring Program
FSZ	Farmland Security Zone
g	gravity - unit of ground acceleration; 1.0 g = force of gravity
GHG	greenhouse gas
gpd	gallons per day
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
HCP	Habitat Conservation Plan
HMBP	Hazardous Materials Business Plan
I&R	Illingworth & Rodkin
IS/MND	Initial Study/Mitigated Negative Declaration
ISR	Indirect Source Review
JLUS	Joint Land Use Study (NAS Lemoore)
JLUSPC	JLUS Policy Committee
KCAG	Kings County Association of Governments
KCFD	Kings County Fire Department
KCSO	Kings County Sheriff's Office
KCDEHS	Kings County Division of Environmental Health Services
kV	kilovolt (unit of electrical potential)
KWRA	Kings Waste and Recycling Authority
L_{dn}	day-night average noise level
L_{eq}	equivalent hourly average noise level
L_{max}	maximum instantaneous noise level
LAMP	Local Agency Management Program
LOA	Live Oak Associates
LOS	Level of Service
M&I	Municipal and Industrial (water supply)
MBTA	Migratory Bird Treaty Act
MM	Mitigation Measure
MMT	Million Metric Tons
MND	Mitigated Negative Declaration
MTA	Moore Twining Associates
MW	Megawatt
NAHC	Native American Heritage Commission
NASL	Naval Air Station Lemoore
NEPA	National Environmental Policy Act
NIOSH	National Institute for Occupational Safety and Health
NOD	Notice of Determination
NOI	Notice of Intent
NOP	Notice of Preparation
PPV	Peak Particle Velocity (vibration measure)
PRC	California Public Resources Code

ACRONYMS AND ABBREVIATIONS (Cont'd)

PV	photovoltaic
ROW	Right of Way
RPS	Renewables Portfolio Standard
RTP	Regional Transportation Plan
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SCADA	Supervisory Control and Data Acquisition
SCE	Southern California Edison
SGF	Solar Generating Facility
SGMA	Sustainable Groundwater Management Act
SHPO	State Historic Preservation Office
SJVAPCD	San Joaquin Valley Air Pollution Control District
SoCalGas	Southern California Gas Company
SR	State Route
SRP	Soil Reclamation Plan
SSC	species of special concern
SWMP	Solid Waste Management Plan
SWP	State Water Project
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TCP	Traditional Cultural Place
TCR	Tribal Cultural Resource
USA	Underground Service Alert
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VdB	vibration velocity level in decibels
VMT	Vehicle Miles Traveled
WAC	Williamson Act Contract
WSA	Water Supply Assessment
WSP	Westlands Solar Park
WWD	Westlands Water District
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O&M	operations and maintenance
OPR	Governor's Office of Planning and Research
OWTS	Onsite Wastewater Treatment System
PEIR	Program (or Programmatic) Environmental Impact Report
PG&E	Pacific Gas and Electric Company
PMWAP	Pest Management and Weed Abatement Plan
PPA	Power Purchase Agreement

CHAPTER 1 – INTRODUCTION

1.1. PREPARATION OF AN IS/MND UNDER CEQA

This document is an Initial Study and Mitigated Negative Declaration (IS/MND) prepared pursuant to the California Environmental Quality Act (CEQA) for the proposed Grape Solar Project. This MND has been prepared in accordance with the CEQA, Public Resources Code Sections 21000 et seq., and the State CEQA Guidelines.

An Initial Study is conducted by a lead agency to determine if a project may have a significant effect on the environment. In accordance with the CEQA Guidelines, Section 15064, an Environmental Impact Report (EIR) must be prepared if the Initial Study indicates that the proposed project under review may have a potentially significant impact on the environment. A Negative Declaration may be prepared instead, if the lead agency prepares a written statement describing the reasons why a proposed project would not have a significant effect on the environment, and, therefore, why it does not require the preparation of an EIR (CEQA Guidelines Section 15371). According to CEQA Guidelines Section 15070, a Negative Declaration shall be prepared for a project subject to CEQA when either:

a) *The Initial Study shows there is no substantial evidence, in light of the whole record before the agency, that the proposed project may have a significant effect on the environment, or*

b) *The Initial Study identified potentially significant effects, but:*

    (1) *Revisions in the project plans or proposals made by or agreed to by the applicant before the proposed negative declaration is released for public review would avoid the effects or mitigate the effects to a point where clearly no significant effects would occur, and*

    (2) *There is no substantial evidence, in light of the whole record before the agency, that the proposed project as revised may have a significant effect on the environment.*

If revisions are adopted into the proposed project in accordance with the CEQA Guidelines Section 15070(b), a Mitigated Negative Declaration is prepared. This document includes such revisions in the form of mitigation measures. Therefore, this document is a Mitigated Negative Declaration and incorporates all of the elements of an Initial Study. Hereafter this document is referred to as an MND.

1.2. THIS IS/MND IS TIERED FROM THE PROGRAM EIR ON THE WESTLANDS SOLAR PARK MASTER PLAN AND GEN-TIE CORRIDORS PLAN

The Grape Solar Project is located within the Westlands Solar Park (WSP), a master planned solar complex covering approximately 20,938 acres in west-central Kings County. The WSP Master Plan and Gen-Tie Corridors Plan was prepared by the Westlands Water District (WWD) to provide policy guidance for the reuse of retired farmlands owned by WWD, which comprise approximately half of the Master Plan area. In compliance with State CEQA Guidelines Section 15168, the WWD prepared a Program EIR (PEIR) (SCH No. 2013031043) which addressed the potential environmental impacts associated with future solar development under the WSP Master Plan and Gen-Tie Corridors Plan. The PEIR also addressed the potential impacts associated with the planned gen-tie corridor extending from the WSP to the Gates substation to the west, which is required for the transmission of WSP solar generation to the State electrical grid. On January 16, 2018, the WWD Board of Directors certified the PEIR under CEQA and approved the WSP Master Plan and Gen-Tie Corridors Plan as a WWD policy document.

The PEIR on the WSP Master Plan and Gen-Tie Corridors Plan (hereafter "WSP Master Plan PEIR") was prepared in close coordination with the staff of the Kings County Community Development Agency (CDA), in recognition of the County's role as a responsible agency for the approval of Conditional Use Permits (CUPs) for individual solar generating facilities (SGFs) to be developed within the WSP Master Plan area. This approach was intended by both WWD and Kings County CDA to provide for the tiering of subsequent MNDs from the PEIR, as provided under CEQA Guidelines Section 15168 (see "Tiering under CEQA" below for further discussion). The Draft PEIR incorporated all revisions requested by the Kings County CDA with the express purpose of making the PEIR consistent with County practices, and thus facilitating the ability of the Kings County Planning Commission to adopt subsequent MNDs that would be tiered from the certified PEIR. This would also enable the certified PEIR to be incorporated by reference into the subsequent MNDs prepared by Kings County (per CEQA Guidelines Section 15150), and would enable the Planning Commission's consideration of the contents of the certified PEIR when adopting the subsequent MNDs for solar projects proposed within the WSP Master Plan area.

TIERING UNDER CEQA

The concept of tiering is addressed in CEQA Guidelines Sections 15152 and 15168(c). "Tiering" refers to the coverage of general environmental matters in broad, program- or plan-level EIRs, such as the WSP Master Plan PEIR, with subsequent focused environmental documents prepared for individual projects that implement the program or plan. The project environmental document incorporates by reference the broader discussions in the Program EIR and concentrates on project-specific issues. The CEQA Statues and the Guidelines encourage the use of tiered environmental documents to reduce delays and excessive paperwork in the environmental review process. This is accomplished in tiered documents by eliminating repetitive analyses of issues that were adequately addressed in the Program EIR and by incorporating those analyses by reference.

The Program EIR evaluated the environmental impacts of the WSP Master Plan to the greatest extent possible. Tiering allows subsequent environmental review to rely on the WSP Master Plan PEIR for the following:

- A discussion of general background and setting information for environmental topic areas;
- Overall growth-related issues;
- Issues that were evaluated in sufficient detail in the Program EIR and for which there is no significant new information or change in circumstances that would require further analysis; and
- Long-term cumulative impacts.

Subsequent tiered environmental documents should incorporate relevant information from the WSP Master Plan PEIR including:

- A summary of background (setting information);
- Identification of applicable standards of significance; and
- Identification of applicable impacts and mitigation measures.

LEAD AGENCY

The WWD was the CEQA Lead Agency responsible for preparation and certification of the Westlands Solar Park Master Plan and Gen-Tie Corridors Plan PEIR. As mentioned, Kings County is a Responsible Agency under CEQA for purposes of the PEIR since the County is responsible for the approval of Conditional Use Permits for individual solar projects proposed within the WSP Master Plan area.

Under CEQA Guidelines Section 15096(a), a Responsible Agency complies with CEQA by considering the EIR or MND prepared by the Lead Agency and by reaching its own conclusions on whether and how to approve the project involved. This provides for the Kings County Planning Commission's consideration of the WSP Master Plan and Gen-Tie Corridors Plan PEIR in the course of its CEQA review of subsequent solar projects covered by the PEIR.

Under CEQA Guidelines Section 15052, a Responsible Agency may assume the role of Lead Agency if it finds that further environmental documentation is required under CEQA in conjunction with a subsequent project-specific approval within its purview. This provides for Kings County's preparation of a subsequent MND that is tiered from the Program EIR for purposes of CUP approval.

In summary, the CEQA Guidelines provide for Kings County's preparation of an MND for the Grape Solar Project, as a tiered and subsequent environmental document to the Program EIR on the Westlands Solar Park Master Plan and Gen-Tie Corridors Plan. Under CEQA, Kings County may also incorporate by reference certain information and evaluation contained in the Program EIR that is applicable to the Grape Solar Project, although the MND must include a summary of background/setting information, identification of standards of significance, and discussion of project-specific impacts and mitigation measures. The information and evaluation that is incorporated by reference is not required to be repeated or duplicated in the MND, provided the Planning Commission considers the contents of the Program EIR in making its decision to adopt the MND.

CHAPTER 2 – DESCRIPTION OF THE PROPOSED PROJECT

2.1. BACKGROUND INFORMATION

1. Project Title

Grape Solar Project and Gen-Tie Line
Kings County Conditional Use Permit File No: CUP 20-02.

2. Lead Agency Name and Address

Kings County Community Development Agency
1400 West Lacey Boulevard, Building #6
Hanford, CA 93230

3. Contact Person, Phone Number, and Email Address

Chuck Kinney, Deputy Director – Planning
559-852-2670
Chuck.Kinney@co.kings.ca.us

4. Project Location

Grape Solar Project – The 1,759-acre Grape Solar Project site is located on the north side of Nevada Avenue, approximately one-half mile west of SR-41. The southern site boundary fronts onto Nevada Avenue for a distance of two miles, and the 25th Avenue alignment bisects the site from north to south (see Figures 1 and 2). Assessor's Parcel Numbers: 026-320-010, -011, -021, -022, 023, -024, -025, -026, -027, -028; and 026-330-032, -033, -034, -035, -036, -037, -055 and -057.

Gen-Tie Line – The CUP application includes a 230-kV Gen-Tie Line extending from the Grape Solar Project site westward along Nevada Avenue for a distance of 6.2 miles to the Fresno County Line (see Figures 1 and 2).

5. Project Sponsor's Name and Address

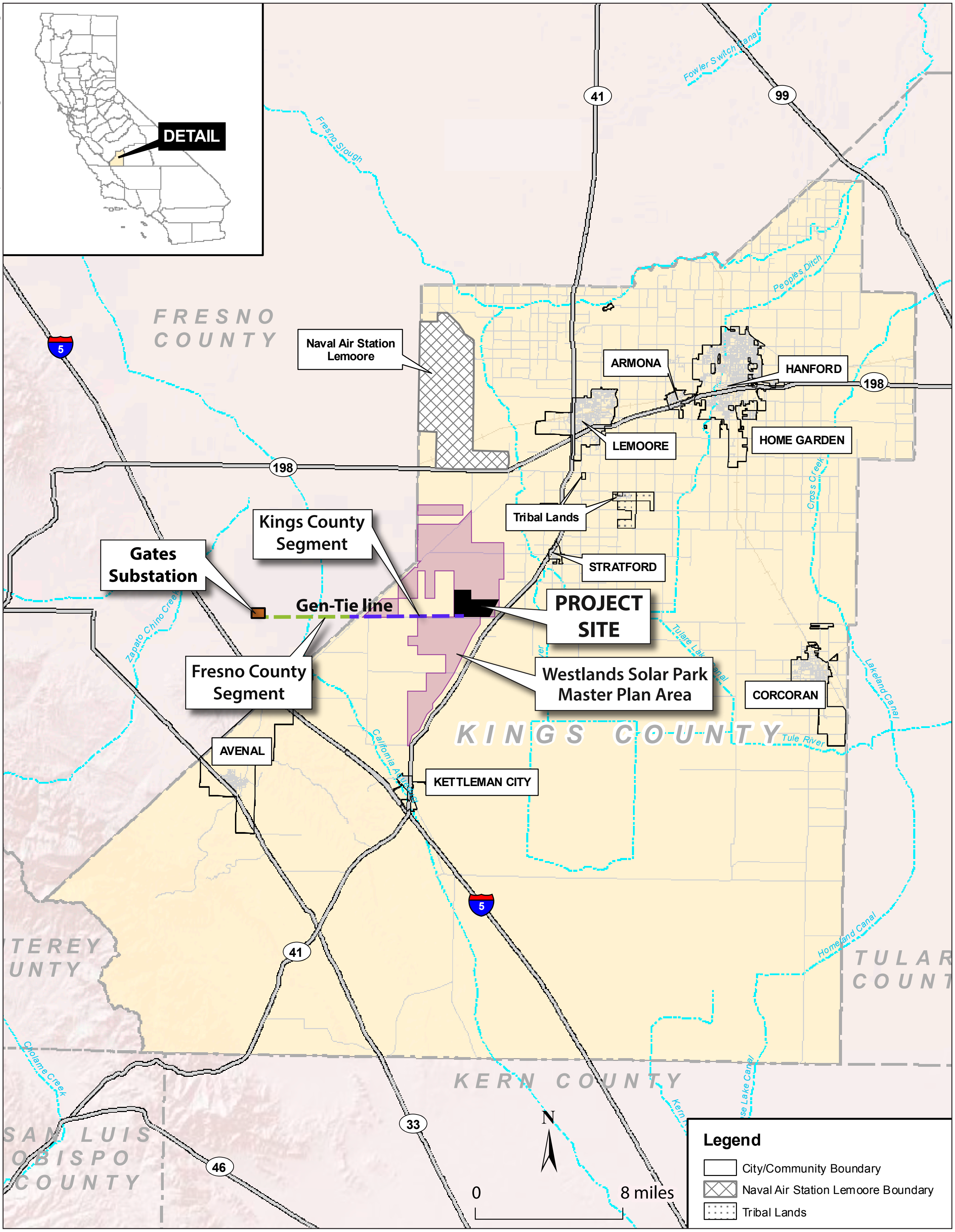
Westlands Grape, LLC
Robert G. Dowds, Manager
4700 Wilshire Boulevard
Los Angeles, CA 90010
Contact: Mohammed T. Kabir

6. General Plan Designation

The 2035 Kings County General Plan designates the eastern-most 519 acres of the project site as "Exclusive Agriculture – 40 acre," and the remaining 1,240 acres of the site as "General Agriculture – 40 acre."

7. Zoning

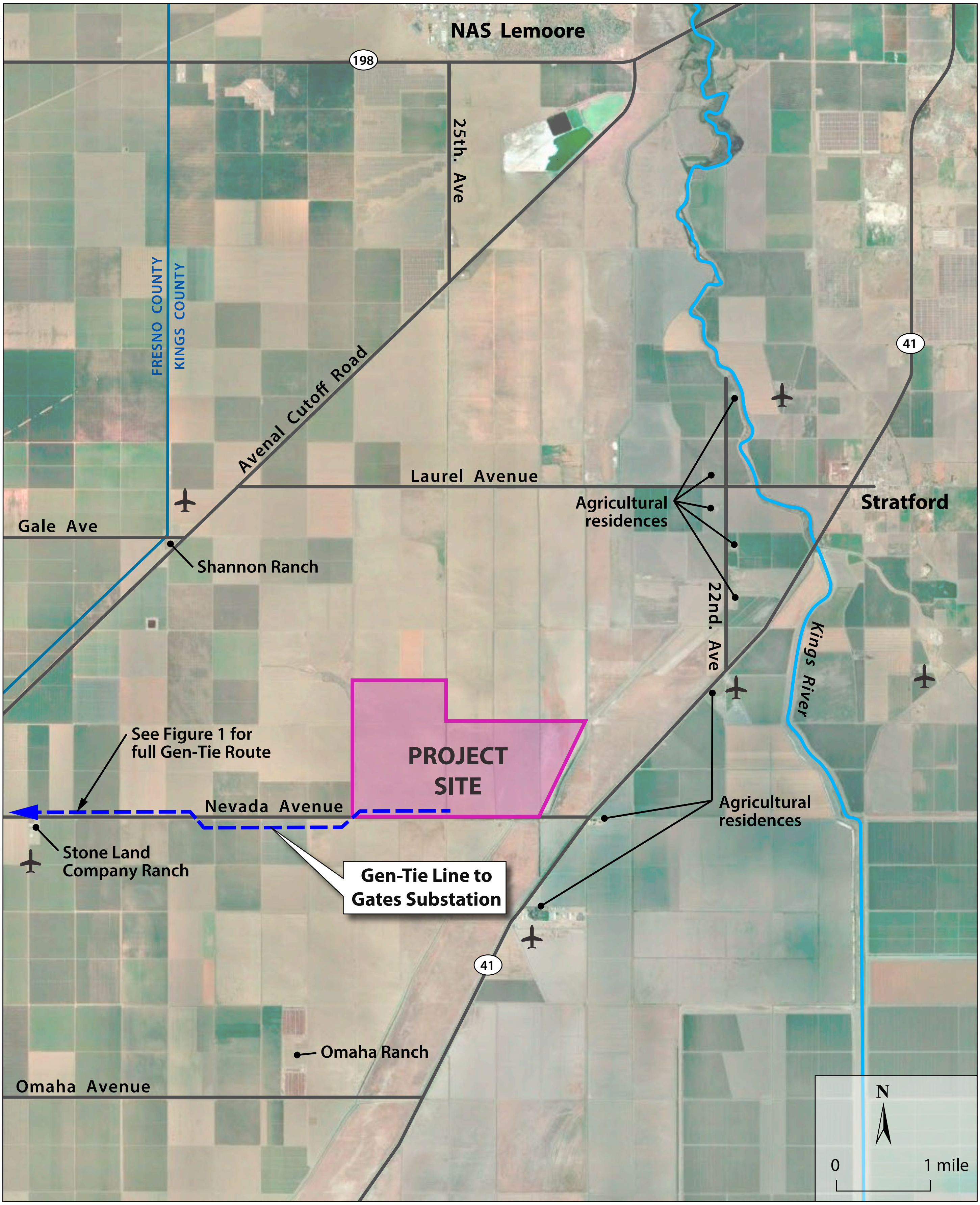
Pursuant to the Kings County Development Code, the entire project site is located within the General Agricultural – 40 acre minimum (AG-40) zone district.



Source: Kings County Community Development Agency

Regional Location

Figure 1



Source: Google Earth

Project Vicinity

Figure 2

2.2. PROJECT DESCRIPTION

SITE LOCATION AND DESCRIPTION

Grape Solar Project

The Grape Solar Project will occupy an approximately 1,759-acre site located on the north side of Nevada Avenue, approximately one-half mile west of SR-41. The southern site boundary fronts onto Nevada Avenue for a distance of two miles, and the 25th Avenue alignment bisects the site from north to south (see Figure 1 – Regional Location, and Figure 2 – Project Vicinity). The project site consists of 14 parcels including Assessor's Parcel Nos. 026-320-010, -011, -021, -022, -023, -024, -025, -026, -027, -028; and 026-330-032, -033, -034, -035, -036, -037, -055, -057. (All of these parcels are under the ownership of Westlands Water District, except APN 026-330-032, a 6.5-acre parcel located near the center of the project site, owned by the Edwin and Jacqueline Marks Trust.)

None of the parcels on the Grape Solar Project site is currently subject to Land Conservation Contract or Farmland Security Zone (FSZ) Contract under the Williamson Act. All but one of the project parcels were previously under FSZ contract until the early 2000s when these lands were acquired in lieu of eminent domain by Westlands Water District for the purpose of retiring these degraded farmlands from irrigated agriculture. Government Code Section 51295 provides that Williamson Act contracts (including Farmland Security Zone Contracts) on lands acquired by a public agency in lieu of eminent domain are deemed null and void at the time of the acquisition (i.e., the contracts are deemed never to have existed). At such time as the ownership of the WWD-owned parcels within the Grape Solar Project site is transferred to the project applicant for purposes of solar development, the transferred parcels are required to be re-enrolled (under new FSZ contracts) in the Williamson Act program pursuant to Government Code Section 51295. Therefore, all of the lands within the Grape Solar Project site are assumed to be subject to Williamson Act contracts for purposes of this IS/MND. For a full discussion, please refer to Section *4.2. Agriculture and Forestry Resources*.

The Grape Solar Project site is virtually level with elevations ranging from a high of 224 feet above mean sea level (AMSL) at the northwest corner of the site to a low of 194 feet AMSL at the southeast corner. The topographic gradient trends east-southeast toward the Kings River located approximately 2.2 miles east. Most of the site is currently used for the cultivation of winter wheat during the wet season and is typically left fallow during the dry season.

The only improved County road providing direct access to the project site is Nevada Avenue which runs along the southern boundary of the site for a distance of two miles. The unimproved 25th Avenue alignment transects the central portion of the project site; however, this unimproved farm road is part of the project ownership and is not a road or right-of-way of Kings County. The 70-kV Henrietta to Tulare Lake sub-transmission line runs through the middle of the site from north to south along the 25th Avenue alignment. There are no buildings, sheds, wells, or other structures on the Grape Solar Project site.

Several agricultural irrigation canals pass through and alongside the project site. These canals convey and distribute surface water and pumped well water throughout the area. A large canal runs in a north-south direction along the east side of the 25th Avenue alignment, and a series of three parallel canals (including the Empire Westside Main Canal) runs along the east side of the site at distances varying from 50 to 400 feet from the east site boundary.

Two agricultural water distribution pipelines traverse the project site from west to east. These pipelines are owned and managed by the Westlands Water District and are part of the District-wide system of lateral pipelines that deliver imported surface water from the California Aqueduct for the purpose of agricultural irrigation. The lands of the project site have not been eligible to receive agricultural irrigation water since the early 2000s when WWD acquired these lands and retired them from irrigated agriculture, as noted above. However, the buried pipelines and their easements will remain on the project site and will be incorporated into the project site plan.

Gen-Tie Line

The Gen-Tie Line serving the Grape Solar Project commences from the southwest corner of the Grape Solar Project site and runs along Nevada Avenue for a distance of 6.2 miles to the Fresno County line just west of Avenal Cutoff Road (see Figures 1 and 2). The Gen-Tie Line will run entirely within easements acquired through private property alongside the County right-of-way except where it crosses public roadways. All of the lands within and adjacent to the Gen-Tie Line are in agricultural use, and comprise fallow fields, row crops, tree crops, and vineyards. [Note: The Gen-Tie Line serving the Grape Solar Project was previously approved by the Kings County Planning Commission as part of the Aquamarine Solar Project and Gen-Tie Line (CUP 17-04). The applicant for the Grape Solar Project is requesting that the Gen-Tie Line be approved as an integral part of the Grape Solar Project in order to establish that the Gen-Tie Line is expressly permitted as part of the Grape Solar Project, and that this CUP approval of the Gen-Tie Line is separate and independent from the approval of the Gen-Tie Line in the Aquamarine Solar Project and Gen-Tie Line CUP. See "Project Overview" below for a detailed discussion.]

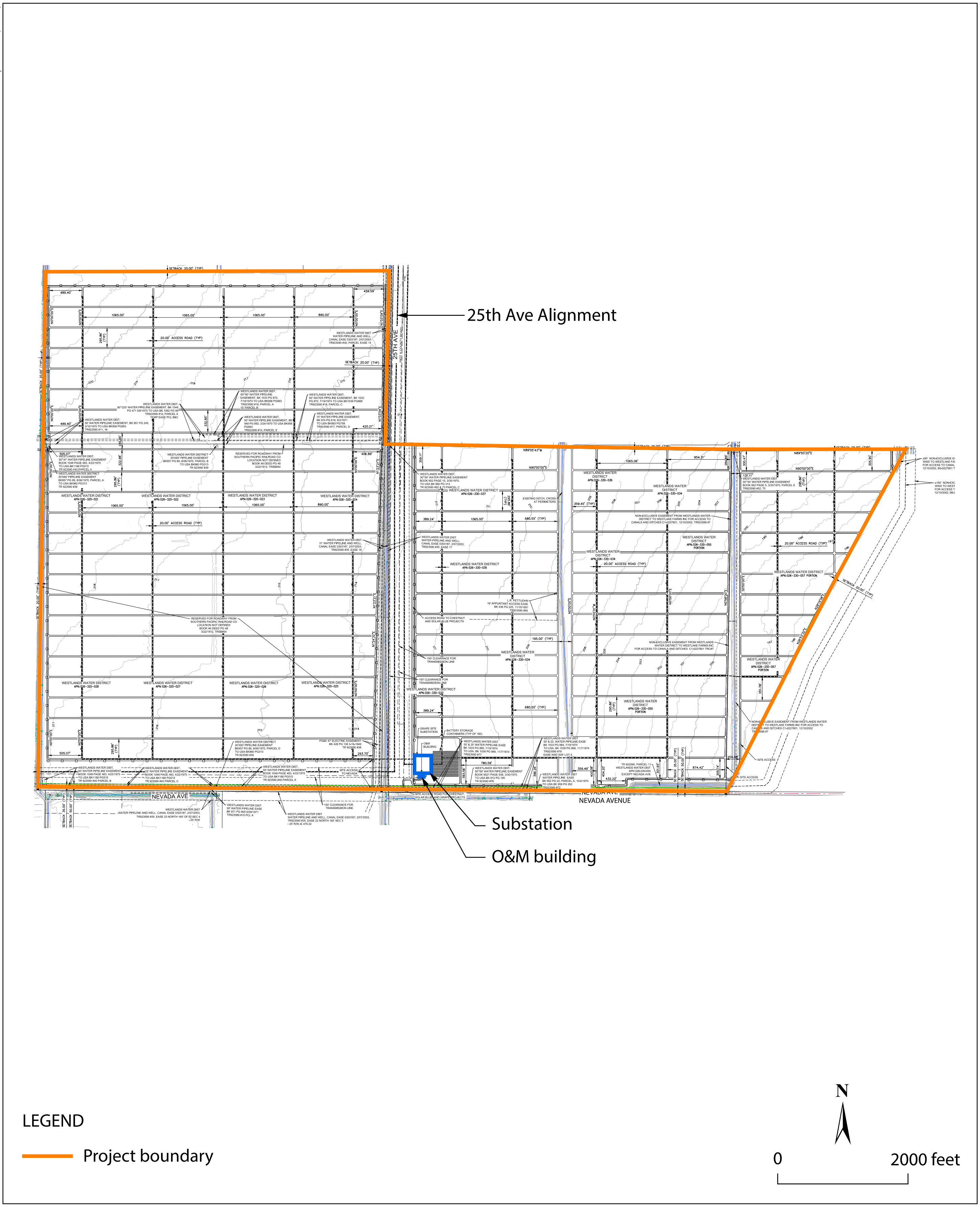
PROJECT OVERVIEW

Solar Generating Facility

The Grape Solar Project is planned to generate at total of 250 MW (AC) of electrical output from solar photovoltaic (PV) modules (see Figures 3a–3e). The project is planned to be constructed over a 14-month period in 2022 and 2023.

The solar modules will be mounted on a series of horizontal single-axis trackers which will be oriented north-south and rotate the solar arrays in an east-west direction. The solar modules produce direct current (DC) power and the electricity travels to power conversion stations (PCS) via underground cables to be converted to alternating current (AC) power. The project will include a total of 100 PCSs with power rating of 2.5 MW each, which will step up the generated power to a collection voltage of 34.5-kV.

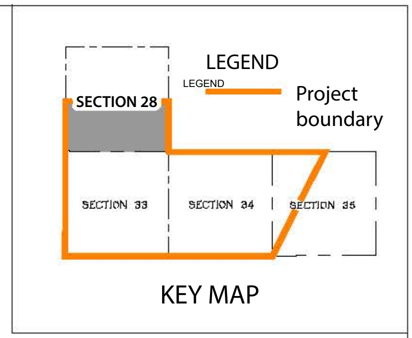
The Grape Solar Project will include an electrical substation, a battery storage facility, and an Operations and Maintenance (O&M) facility, all of which will be located together within a 12-acre area near the southern border of the project site, just northeast of the intersection of the Nevada Avenue and the 25th Avenue alignment. The on-site substation will step up the generated power from 34.5-kV collection voltage to 230-kV for transmission. The battery storage facility is planned to include 200 battery storage units. The battery storage facility will be used to optimize power delivery to the grid by storing excess generation during low demand periods, and supplying power to the grid when demand is high. Alternatively, the batteries could be distributed throughout the project site, and co-located with the PCSs, although this configuration is unlikely to be selected.

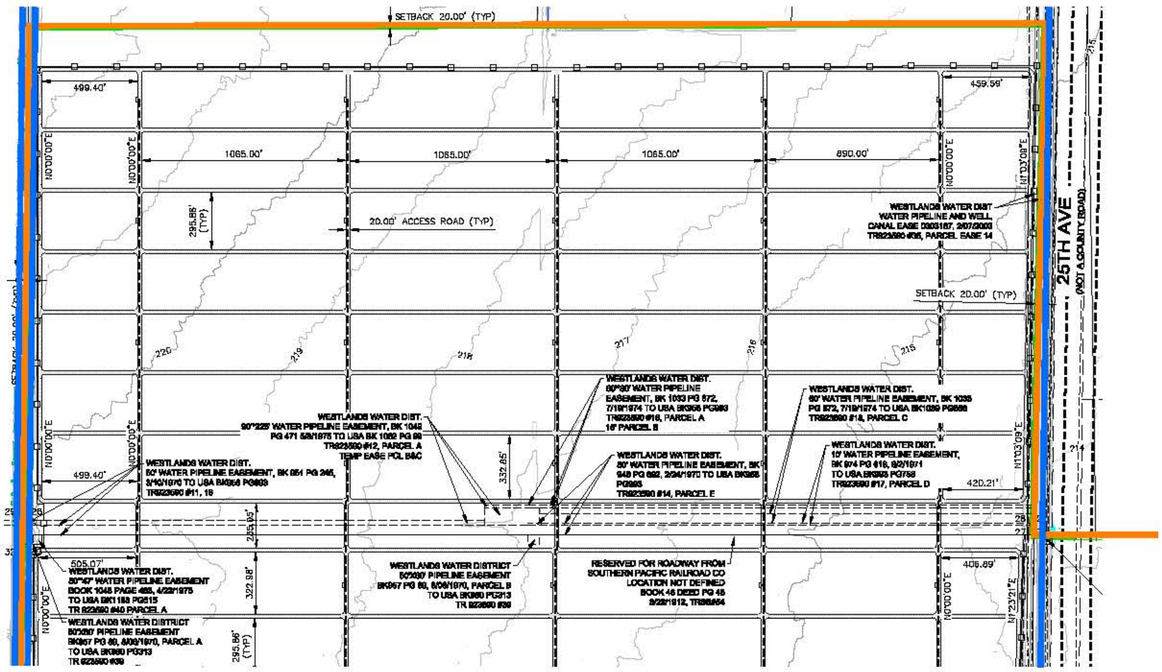


Source: d/k Engineering; Stellavise

Overall Site Plan

Figure 3a





LEGEND

Project boundary

Existing canal

N

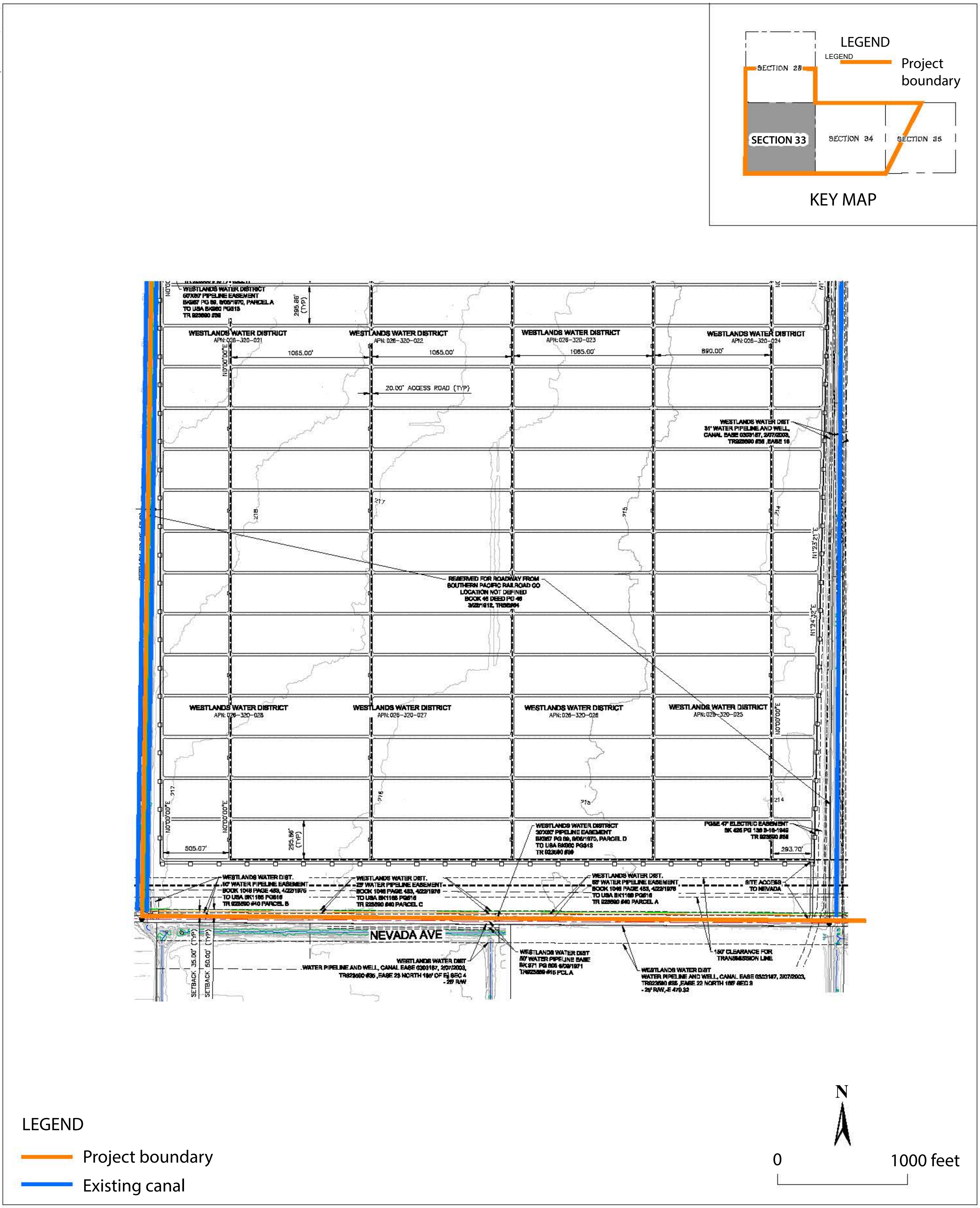
0 1000 feet

Source: d/k Engineering; Stellavise

Site Plan - Northwest (1 of 4)

Figure 3b

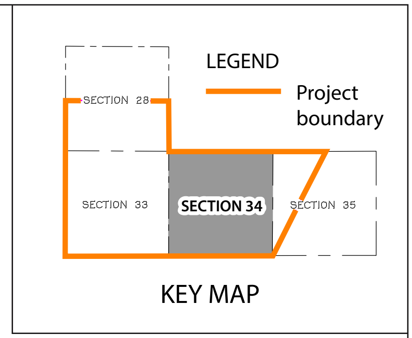
Grape Solar (2021)

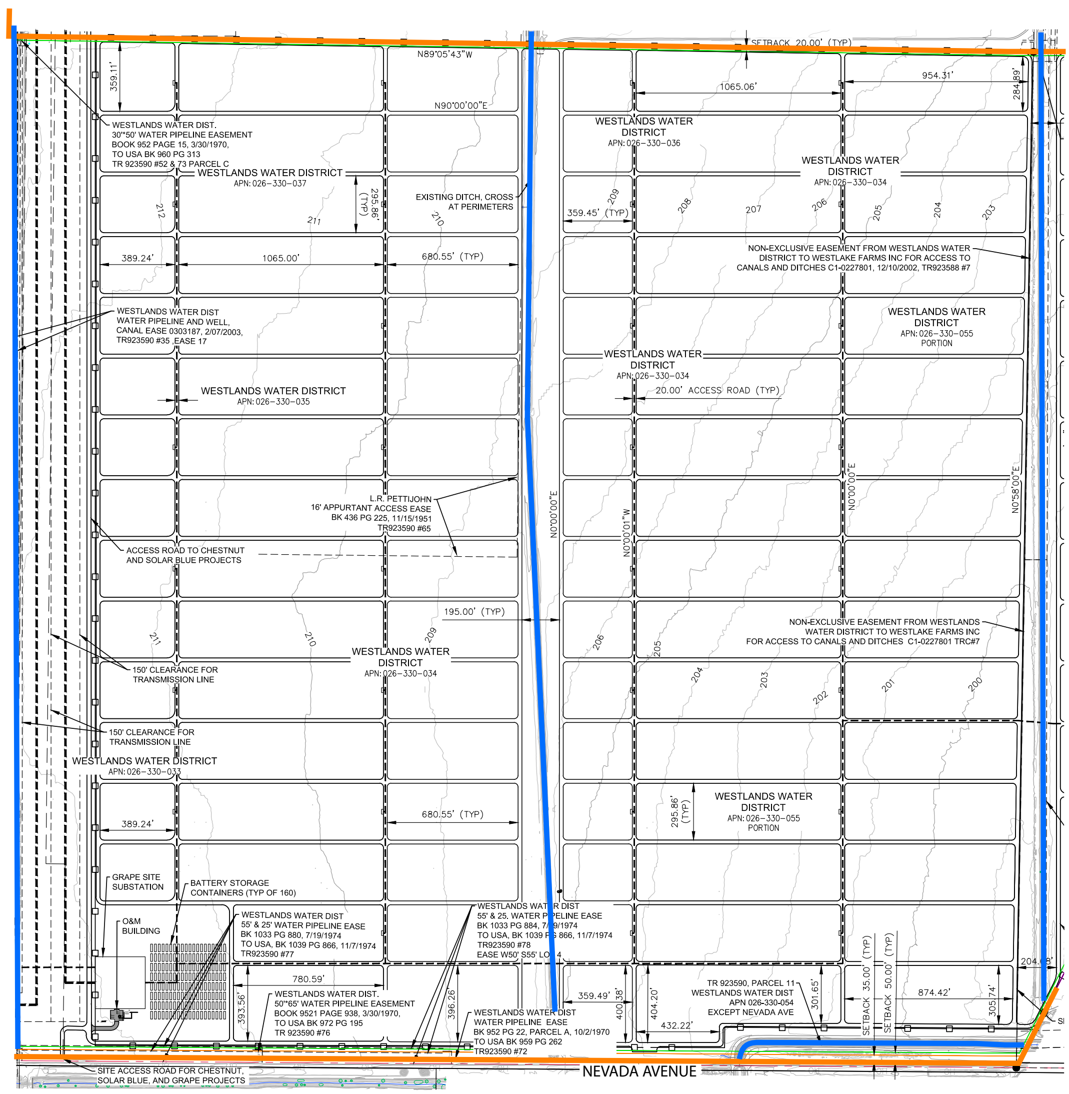


Source: d/k Engineering; Stellavise

Site Plan - West (2 of 4)

Figure 3c





LEGEND

Project boundary

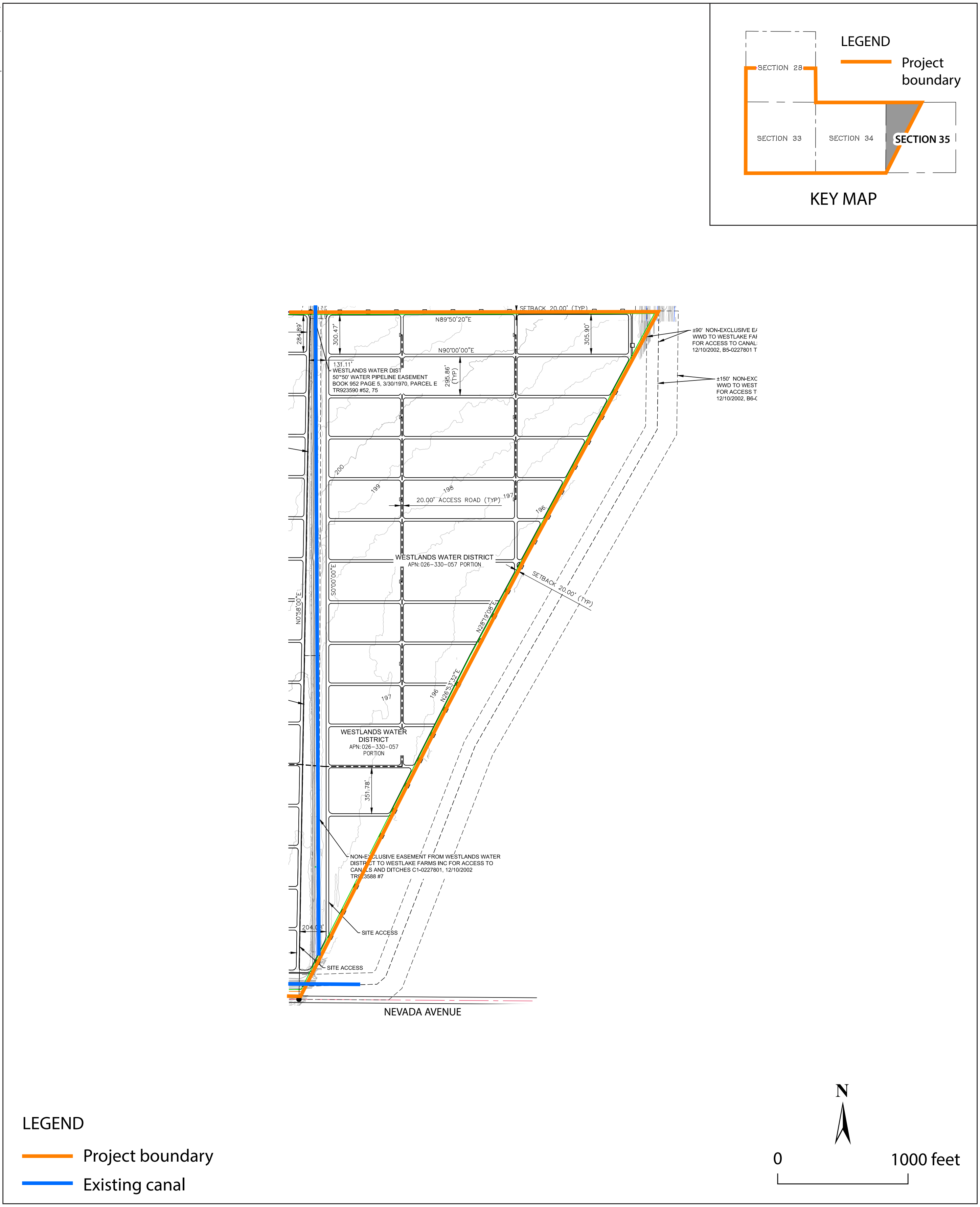
Existing canal

Source: d/k Engineering; Stellavise

Site Plan - Central (3 of 4)

Figure 3d

Grape Solar (2021)



Source: d/k Engineering; Stellavise

Site Plan - East (4 of 4)

Figure 3e

Gen-Tie Line

The power generated at the Grape Solar facility will be conveyed to a new 230-kV gen-tie line that will connect the project to the Point of Interconnection (POI) with the PG&E system at the Gates Substation located 12.7 miles west of the project site. The new Gen-Tie Line will follow the Nevada Avenue for a distance of 6.2 miles to the Fresno County line just west of Avenal Cutoff Road. An additional 6.3 miles of Gen-Tie Line will continue along Jayne Avenue in Fresno County to the Gates Substation. On September 9, 2019, the Kings County portion of the Gen-Tie Line was approved together with the Aquamarine Solar Project (Conditional Use Permit No. 17-04) located one mile north of the Grape Solar Project site. The Fresno County segment of the Gen-Tie Line was approved in a separate Conditional Use Permit from the County of Fresno on November 14, 2019.

In order to formally establish that the described Gen-Tie Line serving the Grape Solar Project is to be approved as an integral component of the Grape Solar Project and included in the subject Conditional Use Permit, the CUP application includes the 6.2-mile segment of the planned Gen-Tie Line running along Nevada Avenue from the planned Grape Solar Substation at the intersection of Nevada and 25th Avenues west to the Fresno County line (see Figures 1 and 2). As mentioned, this Gen-Tie segment was previously approved as part of the Aquamarine Solar Project and Gen-Tie Line (CUP 17-04) on September 9, 2019. However, the applicant is specifically seeking approval of the 6.2-mile Gen-Tie segment serving the Grape Solar Project as part of the Conditional Use Permit for the Grape Solar Project in order to establish that this CUP approval of the Gen-Tie Line is separate and independent from the approval of the Gen-Tie Line in the Aquamarine Solar Project and Gen-Tie Line CUP. Full environmental review under CEQA for the entire Kings County portion of the Gen-Tie Line was provided in the Initial Study/Mitigated Negative Declaration (IS/MND) on the Aquamarine Solar Project and Gen-Tie Line, which is hereby incorporated into this document by reference. This provides CEQA review for the inclusion of the subject 6.2-mile Gen-Tie segment as part of the Conditional Use Permit for the Grape Solar Project. Since there have been no changes to the Gen-Tie project or in circumstances related to the Gen-Tie Line which have occurred since the Planning Commission's adoption of the Aquamarine Solar Project and Gen-Tie Line IS/MND on September 9, 2019, no further environmental review is required under CEQA for the subject 6.2-mile segment of the Gen-Tie Line. Therefore, this IS/MND does not repeat the detailed project description or environmental evaluation of the Kings County portion of the Gen-Tie Line contained in the previously adopted Aquamarine Solar Project and Gen-Tie Line IS/MND, which is available for review at https://www.countyofkings.com/home/showpublisheddocument?id=22579.

PROJECT PURPOSE AND OBJECTIVES

The purpose and objectives of the Grape Solar Project are as follows:

- Generate up to 250 megawatts (MW) of clean, renewable electrical power utilizing solar photovoltaic (PV) technology.
- Help implement the State's goal of increased electrical generation with renewable resources under California's Renewables Portfolio Standard (RPS).
- Help implement the State's Global Warming Solutions Act of 2006 (AB 32), as supplemented in 2016 by SB 32, by providing a non-fossil fuel based source of electricity that will replace existing fossil-based generation and thereby contribute to the overall reduction in greenhouse gas emissions.

- Provide a new source of energy storage that assists the State in achieving the energy storage target of 1.3 gigawatts, consistent with the terms of AB 2514.
- Provide for the economically viable and environmentally beneficial reuse of the site's physically impaired agricultural soils.
- Provide a utility-scale solar generation facility on highly disturbed lands which provide minimal habitat value for wildlife.
- Create new employment opportunities for local residents.
- Positively contribute to the local economy through stimulation of economic activity such as creation of secondary multiplier employment and the purchase of materials and services.

CONSTRUCTION OF SOLAR GENERATING FACILITY

The completion of the Grape Solar generating facility will involve three major construction phases, including: 1) site preparation activities; 2) installation of solar arrays and electrical components; and 3) construction of the on-site substation, and battery storage system. Each of these construction phases is described in turn below.

Site Preparation Activities

Pre-construction Activities

The site development process will begin with pre-construction activities such as surveying and staking for various project elements like internal gravel driveways, PV array locations, electrical trenches, equipment pads, and support structures. The next step will be construction mobilization, which will include delivering initial equipment, supplies, and temporary construction trailers to the site.

Clearing and Grading

Prior to facility construction, the site will be cleared of vegetation, graded and compacted. Site clearing and soil preparation will occur incrementally as needed, and will not proceed to a new area until that area is needed for the next construction phase. Vegetative cover will be retained as long as possible to minimize exposed soils and reduce potential for erosion and wind-blown dust.

Since the existing ground is generally level, with only agricultural furrows creating minor terrain roughness, the solar development can be accommodated without mass grading. Ground preparation will include tilling and grading to smooth out existing agricultural furrows, followed by compaction with rollers. The existing topsoil will not be removed. Final grades will be designed to provide for positive drainage. Measures for erosion and sediment control will also be implemented, as described in "Stormwater Management and Erosion Control" below.

Construction Staging

The project would include one main staging area, likely to be located on 5 to 10 acres on the north side of Nevada Avenue and east of the 25th Avenue alignment. The staging area will include construction offices, a first aid station, worker parking, areas for equipment storage, cleaning, and maintenance, a truck unloading area, and an area for storing and assembling the PV systems prior to installation. Portable chemical toilets will provide for sanitary needs and bottled drinking water will be delivered to the site. The staging area will require a power source for temporary lighting, which will either be supplied by portable generators or existing local distribution lines. The staging area will be enclosed by security fencing. During construction, the additional staging areas may be located within the project site for temporary material storage and assembly.

Temporary Internal Driveways

Construction access through the project site will be provided by temporary all-weather driveways composed of native compacted soil and treated with dust palliative as needed. Temporary project entrances will be composed of gravel, and tire wash racks will be installed at the project entries for washing wheels of construction vehicles prior to exiting in order to avoid tracking of mud and sediment onto Nevada Avenue.

The entire project site is accessible from existing farm roads which would be utilized during construction. As noted above, several canals cross the project site in a north-south direction, and pre-fabricated bridges may be installed across one or more of these canals with the prior approval as to design and location from the Kings County Fire Department and Kings County Public Works to augment internal access and circulation during construction. These pre-fabricated bridges would fully span any canal, avoiding any disturbance to canal banks and canal waters, and would be constructed in a manner to ensure that no fill is placed within canal limits.

Perimeter Fencing

Prior to installation of solar arrays, the perimeter of each discrete solar layout area will be securely fenced and gated to prevent unauthorized access. The perimeter fencing will consist of 6-foot chain-link galvanized metal topped with standard three-strand barbed wire. Fence posts will either be drilled and grouted or driven into the soil profile using truck mounted vibratory drivers (see Figure 6 for fence detail). All fence posts will be capped to prevent the entrapment of small birds. Vehicle access gates will be installed at the project entrances on Nevada Avenue; these gates will remain locked when not in use.

In order to allow unimpeded passage of kit fox and other local wildlife through the Grape Solar Project site, all security fencing will include a continuous 5-inch gap between the bottom of the fence and the ground surface.

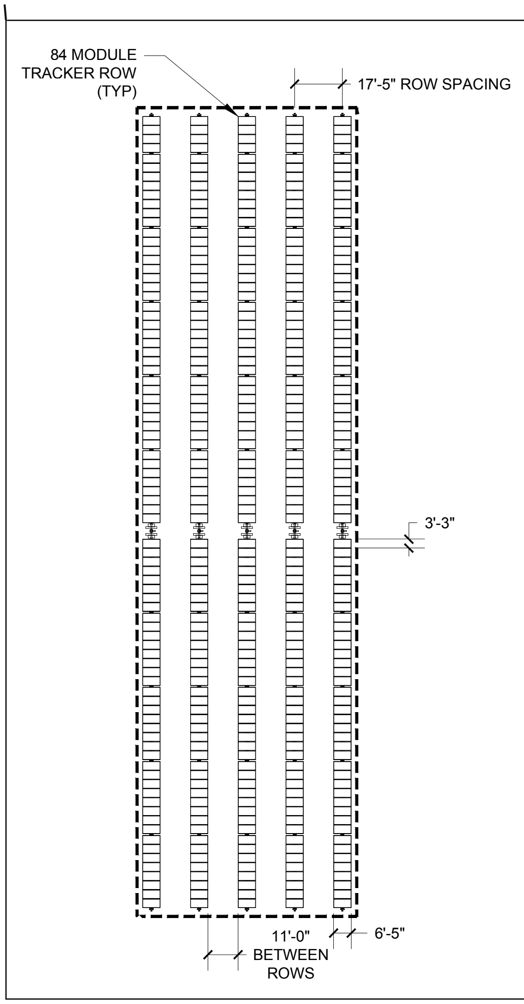
Installation of Solar Arrays and Electrical Components

Solar Arrays

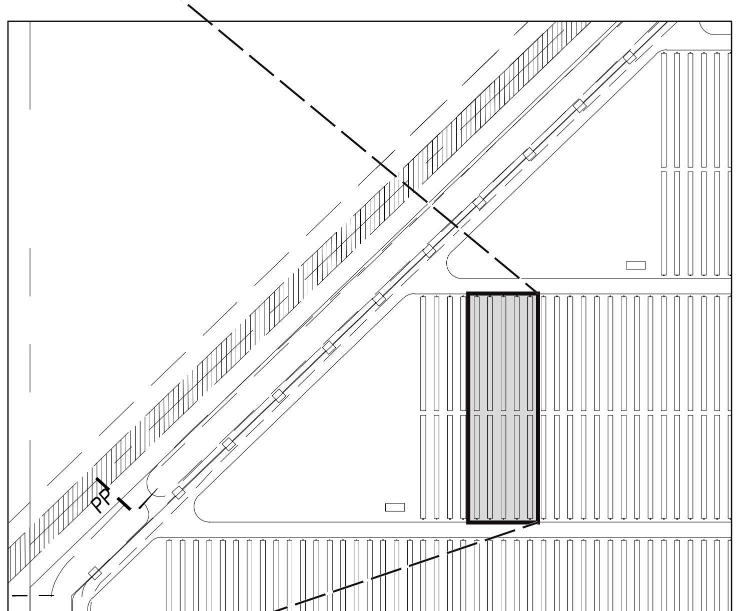
The photovoltaic modules selected for the project will be composed of poly-crystalline silicon solar cells arranged on larger panels (measuring approximately 6’-5” by 3’-3”), and protected with tempered glass panes (see Figure 4). The PV cells are dark in color to maximize absorption and minimize reflectance of sunlight.

Construction of the solar arrays will begin with installation of the steel posts (cylindrical pipes, H-beams or similar) which will be driven into the ground using truck-mounted vibratory drivers. The posts will be installed at approximately 10 foot intervals to depths of 4 to 10 feet, with actual depths in depending on localized soil conditions and load factors.

Solar PV Modules on Horizontal Trackers



Solar Array

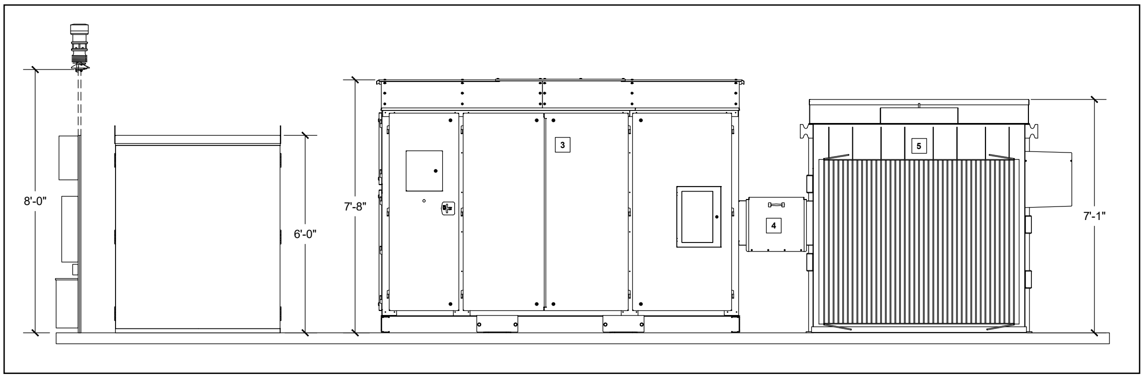


Plan Detail

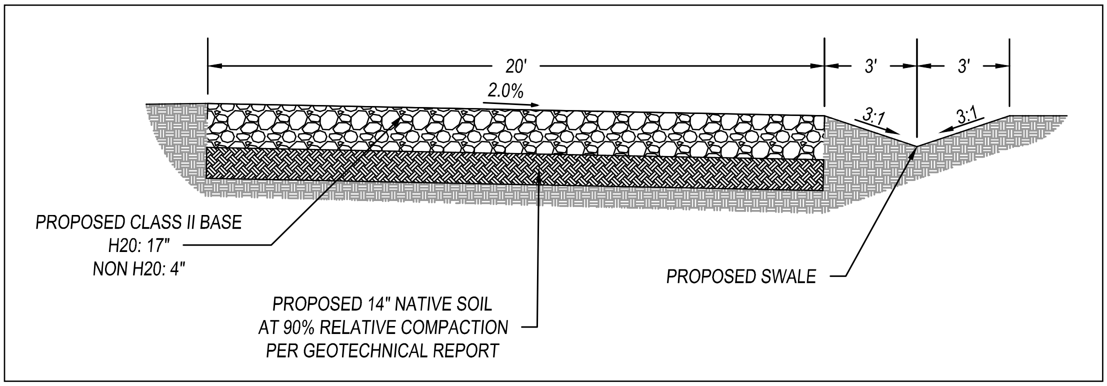
Source: Stellavise

Solar Array Details

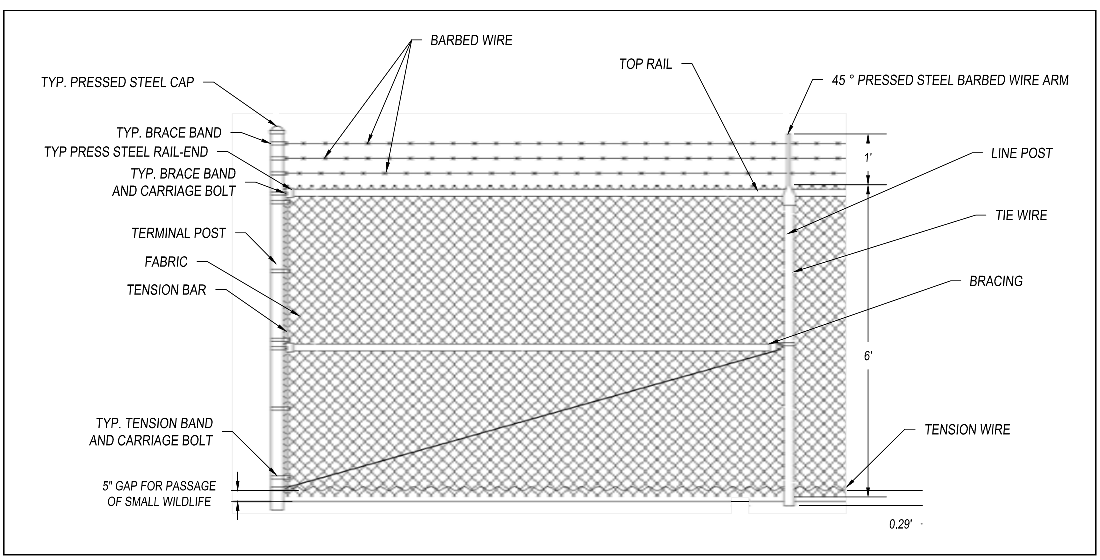
Figure 4



Inverter/Transformer Pad



Internal Gravel Maintenance Road



Perimeter Fence

Source: Stellavise; 4 Creeks Engineering

Solar Facility Details

Figure 5

Next, the torque tubes and motor drivers for the single-axis trackers will be mounted on the installed posts in a north-south orientation. This will be followed by placement of metal racking systems on the trackers, and finally installation of solar modules on the racking systems. The maximum planned length of the solar arrays will be 400 feet between internal 20-foot wide gravel driveways, although some arrays will be shorter to accommodate the irregular site boundaries. The completed solar arrays will be spaced approximately 17.5 feet apart (on center) and 5.0 feet from the ground surface, when the modules are in their horizontal resting positions. At maximum tilt, the solar modules would reach a height of approximately 8 feet above ground level, while the lower module edge would be approximately 2 feet from the ground surface. The parallel arrays will be separated by approximately 11 feet of clear area when in the horizontal position.

The electrical output from the PV modules will be collected as DC (direct current) in combiner boxes at each array and delivered via underground cables to the Power Collection Stations (PCSs). The cables will be laid in trenches approximately 3 feet wide and up to 4 feet deep which will be backfilled with native material after cables are laid.

Inverters and Transformers

The PCSs will include inverters and transformers to convert the generated power to collection voltage (see Figure 5). The inverters will convert the DC electrical output to AC, and the transformers will step up the generated voltage to intermediate collection voltage (e.g., 34.5-kV). The PCSs will be placed on equipment pads at predetermined locations where each PCS will serve approximately 2.5 MW of AC power, or the output from approximately 9,125.76 modules for each PCS. The 250 MW Grape Solar project is planned to include 100 PCSs, each on a concrete pad measuring approximately 32- by 13-feet. The medium voltage collection cables will need to cross under the on-site canals at several locations to access the on-site substation. This would be accomplished by boring and directional drilling, with boring pits located on both sides of the canals. Each pit would be approximately 10 feet deep to achieve the minimum undercrossing depth of 3 feet below the bottom of the canals.

Energy Storage System

The Grape Solar Project will include a dedicated energy storage facility adjacent to the project substation for the purpose of optimizing delivery of generated power to the electrical grid. The energy storage system is planned to include 250 prefabricated battery modules or containers, each with a storage capacity of approximately 4 MW hours. The energy storage system will allow storage of generated power when electricity demand is low, and for delivery of stored power when demand is high. The battery storage units would consist of shipping containers 40 feet long by 8 feet wide by 8.5 feet high on concrete foundations. Each battery container would include racks, switchboards, and integrated HVAC units. The inverters and transformers for the battery units would be located outside the battery containers on dedicated equipment pads measuring 10 by 40 feet, with each inverter/transformer set serving two battery containers. Thus the battery storage system would consist of 250 battery containers and 125 inverter/transformer pads.

An alternative to the energy storage configuration described above is possible but is unlikely to be selected. For example, instead of being clustered together near the project substation, the battery storage units could instead be distributed throughout the project and situated adjacent to each PCS. .

The energy storage system would use one or more proven battery storage technologies such as Lithium Ion, Sodium-Sulphur, or Vanadium-Redox-Flow batteries, and could potentially include flywheel banks housed in electrical enclosures. The enclosures would have appropriate fire suppression systems built to code. The final design would include containment features to prevent the escape of liquids or spills from the energy storage site. Each energy storage unit used on site will be designed in compliance with Section 608 of the International Fire Code, which has been adopted by the State of California to minimize risk of fire from stationary storage battery systems and contain fire in the event of such an incident. Under California law, the energy storage also must comply with Article 480 of the Electrical Code, which presents requirements for stationary storage batteries. Article 480 provides the appropriate insulation and venting requirements for these types of systems, further preventing associated risk of fire from the energy storage facility.

Operations Yards and Buildings

The Grape Solar Project will include an operations yard which will provide storage for operational equipment and materials, and provide parking and maneuvering areas for staff vehicles, delivery trucks, and service vehicles. The operations yard will occupy approximately one acre and will include a pre-manufactured operations and maintenance (O&M) building for storage, occasional visits/meetings for maintenance crew and to house the on-site telecommunications infrastructure. The O&M building would measure approximately 40 by 31 feet, and would be 10 feet tall, and 14 feet to the ridge of the pitched roof. The parking area will include 10 spaces including one ADA space. Domestic wastewater disposal would be provided by a septic tank and leachfield system located adjacent to the O&M building. The septic system will be designed and constructed per Kings County standards and will be subject to the approval of the Kings County Building Official. During construction, wastewater needs would be provided by portable chemical toilets which would be serviced by a private contractor.

Project Entrances and Internal Gravel Driveways

The Grape Solar Project will have direct vehicular access from one or more project entrances on Nevada Avenue. The project entrances will be designed and constructed in accordance with the Kings County Improvement Standards.

Permanent access through the project will be provided primarily by internal gravel roadways which will run along the interior of the site perimeter and across the solar fields at intervals of 400 feet or less. The internal gravel roadways will be 20 feet wide to allow passage and maneuvering of emergency and maintenance vehicles. The distance between the internal parallel internal gravel driveways will provide sufficient access throughout the project to provide access for emergency vehicles and personnel. The internal gravel driveways will be designed and constructed to have a continually durable dust free surface, in accordance with the Kings County Improvement Standards, and will be permeable to allow percolation of rainfall into the underlying soil.

Signage

Project signage will consist primarily of identification and safety signs posted around the project perimeter, and safety signage at electrical equipment. During the construction phase, temporary directional signage will be employed as needed. All signage will conform to the sign standards of the Kings County Development Code.

Exterior Lighting

Lighting for the solar facilities will be designed to provide minimum illumination for safety and security while avoiding direct light spillover onto public roadways or adjacent properties. Permanent exterior lighting will be installed at the site entrances, the operations yard, and the substation. Lighting systems will be light-activated to automatically come on in the evening and shut off in the morning. Lighting within the solar fields will be confined to the PCSs, which will be activated only when needed by switch or motion sensors. There will be no lighting within the solar arrays, along any internal access driveways, or around the facility perimeters. Light fixtures will be hooded so as to be directed only on-site and away from other properties.

Telecommunications

The solar facility will include a Supervisory Control and Data Acquisition (SCADA) system to provide monitoring of facility operation and remote control of critical components. The solar arrays will be connected by fiber optic or other cabling that will be installed in buried conduit leading to a centrally located SCADA system cabinet. The SCADA system will be connected to local telecommunications service via overhead lines or buried lines. The SCADA servers will either be housed in the on-site O&M buildings or remotely in a cloud system.

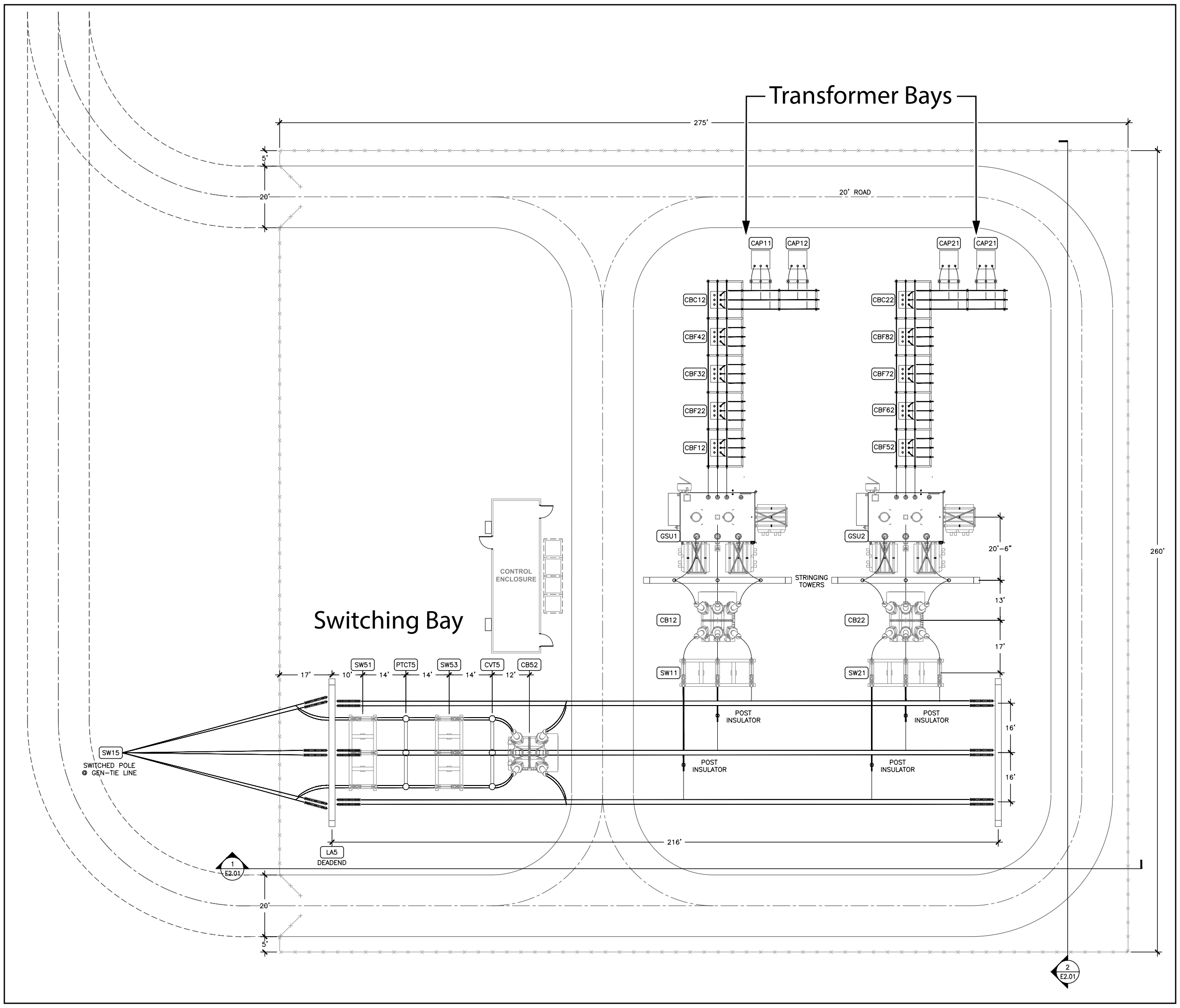
Meteorological Stations

The project will include one or more meteorological monitoring stations ("met" stations) to record key data such as insolation (incident solar radiation), air temperature, precipitation, wind direction and speed, and relative humidity. The met stations will collect meteorological data from about 11 feet above the ground, or about 3 feet above the maximum height of nearby equipment to allow for accurate wind readings.

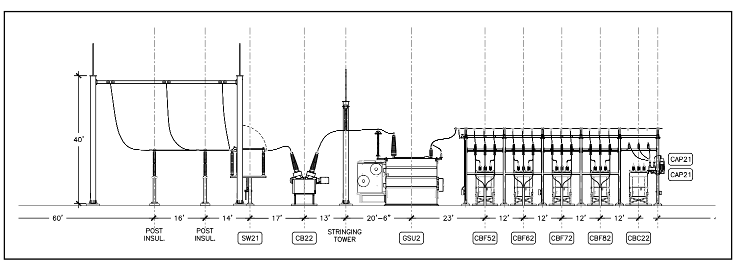
Substation and Interconnection

The project substation will be constructed by a private electrical contractor on an approximately 2-acre site in the southern portion of the Grape Solar Project site (see Figure 6). The substation will collect consolidated solar generation from the PV collection system and would step up the collection voltage from 34.5-kV to 230-kV via high-voltage transformers for transmission to the electrical grid. The substation would include power transformers, a pre-fabricated control building, circuit breakers and related equipment. The transformers would contain oil as an insulating fluid, and the substation would be designed to contain any accidental spill of transformer fluid. The tallest structural elements within the on-site substation would be dead-end structures up to 75 feet high. Each dead-end structure would require foundations excavated to a depth of 20 feet or more.

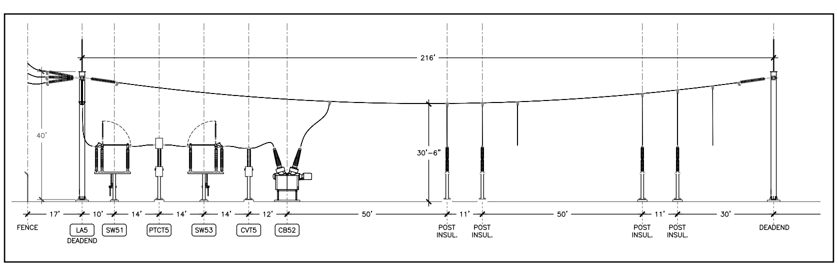
The high voltage power would be delivered from the on-site substation to the approved 230-kV Gen-Tie Line which will run along Nevada Avenue and deliver the solar generated electricity from the Grape Solar Project to the Point of Interconnection (POI) with the PG&E system at the Gates Substation located 12.5 miles west (see Figures 1 and 2). As mentioned, the Gen-Tie Line will follow Nevada Avenue for a distance of 6.2 miles to the Fresno County line just west of Avenal Cutoff Road. An additional 6.3 miles of Gen-Tie Line will continue along Jayne Avenue in Fresno County to the Gates Substation. On September 9, 2019, the Kings County portion of the Gen-Tie Line was approved by the Kings County Planning Commission together with the Aquamarine Solar Project located one mile north of the Grape Solar Project site.



230-Kv Substation Plan



Transformer Bay Elevation



Switching Bay Elevation

Source: CEI Engineering

Substation Plan

Figure 6

(As noted above, the CUP application that is the subject of this IS/MND includes approval of the 6.4-mile long segment of the Gen-Tie Line running from the Grape Solar Substation west to the Fresno County Line. This is intended to formally establish that the Gen-Tie Line is an integral component of the Grape Solar Project under the approved CUP.) On November 14, 2019, the Fresno County segment of the Gen-Tie Line was approved by a separate Conditional Use Permit by the County of Fresno Planning Commission.)

Interconnection Alternative

Another option under consideration for interconnection is to connect to the PG&E system at the on-site substation instead of at the Gates Substation. This would involve the construction of a switching station adjacent to the on-site substation. Under this option, the on-site substation/switching station would be under PG&E's ownership and thus subject to CPUC jurisdiction. CPUC General Order No. 131-D establishes that local jurisdictions are preempted from regulating electric power line projects, distribution lines, substations, or other electric facilities constructed by public utilities subject to the CPUC's jurisdiction.

Impervious Surfaces

The coverage of the solar facility with impervious surfaces will be minimized in order to allow for revegetation and sheep grazing. Solar arrays have a minimal footprint since they are elevated above the ground and mounted on racks supported by narrow profile steel posts. Relatively small areas of impervious surfaces will be created by concrete pads and footings for the inverters/transformers, substation, the O&M building, the battery containers, and asphalt pavement for site entrances and parking area. The internal driveways will be surfaced with decomposed granite or other approved permeable surface pursuant to the Kings County Improvement Standards, and will include no asphalt pavement or other impervious materials. Table 1, on the next page, provides a breakdown of impervious surfaces by equipment and facility type. As shown in Table 1, less than one percent of the ground surface of project site would be covered by impervious surfaces of the Grape Solar Project.

Concomitant Agricultural Uses

Upon completion of each discrete area of the solar facility, the exposed soil would be revegetated with native seed mix which would support sheep grazing as a concomitant agricultural use to the solar operation. The sheep grazing would continue for the life of the solar project and the resulting agricultural production would ensure compliance with the County's Williamson Act Implementation Procedures, specifically in meeting the criteria for the solar facility to be deemed a "compatible use" under the Williamson Act. (See Section *4.2. Agriculture and Forestry Resources* for a detailed discussion of project consistency with the Williamson Act Implementation Procedures.)

Construction Workforce and Equipment

Workforce

During construction, the number of workers would fluctuate depending on the construction stage. As noted previously, completion of the Grape Solar Project will involve three major construction phases, including: 1) site preparation activities; 2) installation of solar arrays and electrical components; and 3) construction of the on-site substation, and installation of the battery storage system.

TABLE 1

COVERAGE BY IMPERVIOUS SURFACES AND GRAVEL DRIVEWAYS AND PERCENTAGE REMAINING IN VEGETATIVE COVER

Equipment/Facility	Area of Coverage (Square Feet)
Impervious Surfaces	
Inverter/Transformer Pads	41,600
Substation Pad/Footings	2,866
Battery Storage Units	130,000
O&M Building	1,240
Operations Parking Area (paved area)	328
Total Impervious Surface Coverage	176,034
Total Coverage by Gravel Driveways (Pervious)	6,828,705
Total Site Area (1,759.29 acres)	76,634,672
Percentage Impervious in Project	**0.23%**
Percentage Gravel Driveways	8.91%
Percentage Impervious + Gravel Driveways	9.14%
Percentage Remaining in Vegetative Cover (= Total Area minus Impervious Surfaces and Gravel Driveways)	69,629,933. (1,600 acres) **90.86%**

As shown in Table 2, on the next page, the workforce numbers would be greatest during installation of the solar arrays, especially when this construction stage overlaps with the site preparation stage, when a total workforce of 581 construction personnel would be on-site.

Typically, construction would take place between the hours of 7 AM to 3 PM, Monday through Friday, although work could take place outside these hours if needed to maintain schedules. For safety reasons, certain construction tasks, such as final electrical terminations, must be performed after dark when no energy is being produced.

Assuming all workers commute to the site in single-occupant vehicles, they will generate an average of 1,162 daily trips (in-bound and out-bound) or 581 round trips during the peak 6-week construction period when Phases 1 and 2 overlap. Employee traffic generated during less intensive construction periods will be substantially less.

The construction workforce for the Grape Solar Project will be largely drawn from the surrounding communities, with the possible exception of project management personnel. Based on a gravity model using population and distance factors for communities within commuting range, it was determined that the average round-trip commute length for construction personnel would be 90 miles. All workers will be encouraged to carpool.

TABLE 2
OFF-SITE CONSTRUCTION VEHICLE USAGE, BY CONSTRUCTION PHASE

Vehicles	Estimated Usage		
Phase 1 – Site Preparation *(60 work days or 12 weeks)*	**Units**	**Miles/ Round Trip**	**Round Trips/Unit**
Water Trucks[1]	5	3	120
Flat Bed Trucks (Equipment Transport)	7	85	60
Gravel Trucks (End Dump)(Delivery)	35	52	120
Concrete Delivery Trucks	4	50	13
Freight Trucks (Delivery)	25	400	30
Worker Vehicles	286	90	60
Phase 2 – Installation of Solar Arrays *(230 work days or 46 weeks)* *(Overlaps with Phase 1 for 30 work days or 6 weeks)*	**Units**	**Miles/ Round Trip**	**Round Trips/Unit**
Water Trucks	4	3	460
Flat Bed Trucks (Equipment Transport)	16	85	230
Freight Trucks (Delivery)	25	400	30
Worker Vehicles[2]	295	90	230
Phase 3 – Installation of Inverters, Transformers, Substation *(110 work days or 22 weeks)* *(Overlaps with Phase 2 for 65 work days or 13 weeks)*	**Units**	**Miles/ Round Trip**	**Round Trips/Unit**
Water Trucks[1]	1	3	110
Flat Bed Trucks (Equipment Transport)	3	85	110
Concrete Delivery Trucks	4	50	11
Worker Vehicles[2]	30	90	110
Energy Storage System - Installation *(65 work days or 13 weeks)* *(Occurs during Phase 3)*	**Units**	**Miles/ Round Trip**	**Round Trips/Unit**
Water Trucks	1	3	65
Concrete Delivery Trucks	7	50	27
Gravel Trucks (End Dump)(Delivery)	7	52	13
Freight (Delivery)	8	400	47
Equipment Transport Trucks (Delivery)	4	85	5
Worker Vehicles	90	90	65

[1] Water trucks are anticipated to be filled with water from existing agricultural wells in the vicinity.
[2] No carpooling or transit use is assumed for workers' traveling to and from the project site.
[3] Freight deliveries include solar modules, racking systems, support structures, major electrical components, and energy storage system modules, all of which are assumed to originate in equal portions from ports or distribution centers in the Bay Area or Southern California.

Construction Deliveries

The construction of the solar facility will involve the use of numerous pieces of construction equipment and support vehicles at various stages of construction. This will include grading and excavation equipment such as graders, scrapers, dozers, compactors, trenchers, and back-hoes; and general construction equipment like concrete mixers, cranes, hydraulic pile drivers, fork lifts, water trucks, ATVs, pick-up trucks, and generators. This equipment will be brought to the Grape Solar site when needed and will remain within the site throughout the duration of the activities for which they are needed.

Deliveries of solar modules and support structures, electrical components, concrete and aggregate will occur throughout the construction period. The equipment and material deliveries will originate in various locations in central California and will follow designated truck routes to travel to the project site. It is anticipated that deliveries of solar modules, tracking systems, and major electrical components would originate from ports or distribution centers in the Bay Area and/or Southern California. It is anticipated that aggregate supplies would be obtained from the nearest source at Avenal Paving and Gravel located on Highway 33 between Avenal and Coalinga. Similarly, it is expected that concrete would be supplied from a ready-mix plant located outside Coalinga. All other construction deliveries are expected to originate from the Fresno area.

The estimated number of deliveries during all construction stages is shown in Table 2. For the most intensive construction - 6-week period when Phases 1 and 2 overlap - the project will receive an average of 110 deliveries per day, most of which will comprise aggregate deliveries for the internal driveway system. Table 3 on the next page lists the types of equipment that will be utilized during the four main construction stages for the project.

Site Management during Construction

Dust Suppression and Soil Conditioning

During construction, non-potable water will be used for dust control and soil conditioning during earthwork. Based on past experience with similar projects, the water demand for preparation and construction of the 1,759-acre Grape Solar Project would average 0.2 acre-feet per acre (af/ac), resulting in a total consumption of 352 acre-feet of water during the 14-month construction period, or an average of 176 acre-feet per year (afy), assuming the construction period is evenly split between 2022 and 2023. It is anticipated that water for grading and construction will be obtained from the existing agricultural well in the project vicinity.

Curtailment of groundwater pumping to meet the project demand for construction water is not currently foreseen. However, in the unlikely event that such unforeseen curtailment occurs, the relatively small volumes of untreated water that would be temporarily required during construction would be purchased from alternative sources and trucked to the site.

Stormwater Management and Erosion Control

During grading and construction, soil stabilization and runoff control measures would be required to prevent erosion and sedimentation. The particular measures that would be appropriate for conditions within the Grape Solar site would be specified in the Storm Water Pollution Prevention Plan (SWPPP), as required for all projects over 1 acre in size by the State Water Resources Control Board. The SWPPP would specify Best Management Practices (BMPs) such as stormwater runoff control and hazardous waste management measures, and include monitoring and reporting procedures.

TABLE 3
ON-SITE CONSTRUCTION EQUIPMENT USAGE, BY CONSTRUCTION PHASE

Equipment	Estimated Usage		
Phase 1 – Site Preparation *(60 work days or 12 weeks)*	**Units**	**Hours/Day (5 days/week)**	**Days/Unit**
Water Trucks (10,000 gallon)	5	4	45
Graders	3	7	35
Skid Loaders	18	7	30
Front-End Loaders	3	7	35
Roller Compactors	9	7	40
Backhoe	1	7	5
Pickup Trucks	6	4	45
Phase 2 – Installation of Solar Arrays *(230 work days or 46 weeks)* *(Overlaps with Phase 1 for 30 work days or 6 weeks)*	**Units**	**Hours/Day (5 days/wk)**	**Days/Unit**
Water Trucks (10,000 gallon)	4	4	230
Skid Loaders	6	7	135
Tractors – post drivers	6	7	135
Forklifts	22	4	145
Welders	22	4	145
Trenchers	6	4	120
Phase 3 – Installation of Inverters, Transformers, Substation, Connection *(110 work days or 22 weeks)* *(Overlaps with Phase 2 for 65 work days or 13weeks)*	**Units**	**Hours/Day (5 days/wk)**	**Days/Unit**
Water Trucks (10,000 gallon)	1	4	20
Skid Loaders	2	7	30
Front-End Loaders	1	7	7
Roller Compactors	1	7	7
Pile Drivers	2	7	30
Trenchers	4	4	110
Backhoes	2	4	65
Cranes	2	2	110
Aerial Lifts	2	4	65
Asphalt Pavers	1	4	5

Table continued on next page.

TABLE 3 (CONT'D)
ON-SITE CONSTRUCTION EQUIPMENT USAGE, BY CONSTRUCTION PHASE

Equipment	Estimated Usage		
Energy Storage System *(65 work days or 13 weeks)* *(Occurs in Phase 3 or may occur during operations.)*	**Units**	**Hours/Day (5 days/wk)**	**Days/Unit**
Water Trucks (10,000 gallon)	1	4	65
Skid Loaders	2	7	33
Front-End Loaders	2	4	33
Roller Compactors	2	4	33
Pile Drivers	1	4	4
Trenchers	47	4	65
Backhoes	3	4	44
Cranes	1	4	65
Pickup Trucks	2	4	65

Typical measures will include: diversion of runoff away from disturbed areas, protective measures for sensitive areas, mulching for soil stabilization, straw-bale barriers, and siltation or sediment ponds. Specific BMPs will be determined during the final engineering design stage for each project phase. Approval of each respective project SWPPP by the Regional Water Quality Control Board will be obtained prior to initiation of ground disturbing activities for each project phase.

Construction Waste Recycling and Disposal

The waste generated during construction will primarily consist of non-hazardous waste materials such as packing containers and materials, waste lumber, wood pallets, scrap metal, glass and paper. These waste materials will be segregated on-site for recycling or disposal at a Class III landfill.

Some quantities of hazardous wastes will be generated during construction. These waste materials will include waste paint, waste solvents, waste oil, oily rags, used batteries, etc. Hazardous wastes generated during construction will be either recycled or disposed of at a Class I disposal facility, as required.

Revegetation of Completed Project Areas

Upon completion of each section of the solar facility, the exposed soils beneath and around the solar arrays will be vegetated to prevent erosion and provide dust control. The exposed areas will be planted with an approved native seed mix that will contain only "low water use" plant species, thus minimizing water use, discouraging weed infestation, and providing habitat value for native wildlife species.

OPERATION OF SOLAR GENERATING FACILITY

The Grape Solar Project will involve facility operation and monitoring, facility maintenance, and security. These are described in turn below.

Facility Operation and Monitoring

Operational activities will primarily involve monitoring and management of solar generation, which will occur during daylight hours year round. The project proponent will contract with an off-site O&M provider with a facility in the area. Operations staff will not be stationed at the Grape Solar site, but will manage the facility remotely via SCADA ("Supervisory Control and Data Acquisition") systems. Operators will monitor and analyze the collected data to determine maintenance needs, respond to automated alerts from the monitoring systems (i.e., in the event of equipment failures or abnormalities), and communicate with customers and transmission facility operators.

Facility Maintenance

Equipment and Infrastructure Maintenance

Operators will also visit the Grape Solar facility regularly to conduct visual inspections of equipment, internal roadways, and fencing, and perform maintenance or make repairs as necessary. Table 4 provides details on equipment and vehicle usage for operations and maintenance purposes. It is expected that two maintenance personnel would visit the site periodically, with more workers added when repairs or installation of replacement equipment is needed. (See 'Operations Personnel' below for an overview of staffing levels and functions.)

TABLE 4

EQUIPMENT AND VEHICLE USAGE DURING SOLAR FACILITY OPERATIONS AND MAINTENANCE

Equipment	Estimated Usage (Annual)		
	Units	**Hours/Day/Unit**	**Total Days/Unit/Year**
All-Terrain Vehicle (ATV)	2	6	40
Tractor	1	3	40
Portable Generator	2	3	40
Portable Water Trailer w/Pump	1	2	40
Vehicles	**Units**	**Daily Miles/ Unit**	**Total Days/ Unit/Year**
Pickup Truck (Routine O&M)	6	20	40
Pickup Truck (Panel Washing)	2	30	40

As mentioned, the operations yard will include a pre-manufactured O&M building for storage, occasional visits/meetings for maintenance crew and to house the on-site telecommunications server. The sanitary facilities in the O&M building will be connected to an adjacent septic tank and leachfield system which will be designed in accordance with the Kings County Local Agency Management Program for Onsite Wastewater Treatment Systems ("OWTS").

Vegetation and Agricultural Management

Upon the completion of construction within a given area of the project, the exposed soils will be revegetated through seeding for slow-growing grasses, with the entire site revegetated upon completion of construction. Vegetative cover will generally be kept low to prevent shading of solar panels and to minimize buildup of combustible fuel loads. The short vegetation cover will also allow passage of emergency vehicles, and maintenance and panel washing vehicles.
The project site vegetation will be kept low primarily through seasonal sheep grazing and also through mechanical means (e.g., mowing, trimming, hoeing) where needed. The sheep grazing would take place on the project site in order to maintain agricultural activity on these lands which will be re-enrolled in the Williamson Act program upon transfer of ownership from WWD. (The net vegetated area subject to grazing would be approximately 1,600 acres after subtracting internal driveways, equipment pads, O&M building, substation, battery storage containers, and paved parking area.) The sheep grazing will be managed and controlled by temporary sheep enclosures which will be moved progressively through the project site. Grazing will occur from January until the end of the growing season in May, at which time the sheep will be removed. The details of the sheep grazing program will be further described in the Agriculture Management Plan (AMP) which will be prepared and implemented to ensure maintenance of sustainable agricultural operations on the site throughout the life of the project. The detailed requirements of the AMP are specified in Mitigation Measure AG-1 in this IS/MND (see section *4.2. Agriculture and Forestry Resources*). The AMP would be subject to County approval prior to issuance of building permits for the Grape Solar Project. (See section *4.2. Agriculture and Forestry Resources* for detailed discussion of agricultural management requirements for the project.)

Weed and Pest Control

As required under the County Development Code, the Grape Solar Project will include implementation of a Pest Management and Weed Abatement Plan. The Pest Management Plan will be directed toward prevention and control of infestations by rodents such as rats, ground squirrels, gophers, and voles which can cause damage to project structures and spread diseases. The primary objective will be to avoid rodent infestations through preventative measures such as vegetation management (described below) in order to avoid impacts to protected wildlife species. Natural or ecological control through predation by hawks would also provide incidental control of rodent populations. The use of eradication measures such as application of rodenticides would only be employed as a last resort.

The Weed Abatement Plan will specify measures to prevent infestation of invasive weed species which would reduce the grazing value of the site, pose a fire hazard, and potentially spread to neighboring farmland. Weed control will mainly consist of a combination of methods, including the use of weed-free seed mixes for site revegetation, and keeping vegetation low through sheep grazing and mechanical methods such as mowing, trimming, and hoeing. Herbicides would be used only selectively where needed using low impact chemicals and practices that minimize impacts to protected biological species. The Pest Management and Weed Abatement Plan will be submitted for County approval prior to issuance of building permits for the Grape Solar Project.

Fire Safety

The project will include a number of design and operational measures for fire prevention and suppression. Design measures include incorporation of County design standards for minimum driveway widths, ground clearance, and accessibility to all areas of the project. The project proponent would also provide funds toward the purchase of an all-terrain firefighting vehicle capable of accessing the interior portions of the solar facility. Fire prevention measures will include vegetation management as described above to minimize the potential for grass fires. All electrical equipment (including inverters) not located within a larger structure will be designed specifically for outdoor installation, and all electrical equipment will be subject to product safety standards. Vehicles and equipment will be required to be parked or stored away from vegetated areas. All construction and operations personnel will be trained in fire prevention and suppression measures, including the safe shut-down of electrical equipment during emergency incidents. Portable carbon dioxide (CO2) fire extinguishers will be mounted at the inverter/transformer pads throughout the project. Employees will be required to be familiar with the use of fire safety equipment, and smoking will be permitted only in designated areas.

Prior to commencement of site work on the project, the fire prevention and emergency action plans to be implemented during project construction and operation would be prepared and formalized in coordination with the Kings County Fire Department.

As mentioned above, the project would include energy storage facilities consisting of a number of prefabricated electrical enclosures containing battery banks and associated switchboards, inverters and transformers. All battery containers would be installed on concrete foundations designed to provide secondary containment. The enclosures would have appropriate fire suppression systems built to code. Each energy storage unit used on site will be designed in compliance with Section 608 of the International Fire Code, which has been adopted by the State of California to minimize risk of fire from stationary storage battery systems and contain fire in the event of such an incident. Under California law, the battery enclosures also must comply with Article 480 of the Electrical Code, which presents requirements for stationary storage batteries. Article 480 provides the appropriate insulation and venting requirements for these types of systems, further preventing associated risk of fire from the battery enclosures on the project site. Depending on the technology and design of the battery units, the Kings County Fire Department may require purchase of specialized hazmat vehicles and equipment along with mandated training for Fire Department personnel.

Solar Module Cleaning

The PV modules will be washed periodically to remove dust in order 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. Periodic panel washing will likely be most needed during the dry summer months when there is an increased potential for deposition of windblown dust from nearby agricultural operations. It is anticipated that panel washing will be required up to four times per year, and will be accomplished using light utility vehicles with tow-behind water trailers. No chemical cleaners will be used for module washing. It is estimated that water demands from one complete cycle of panel washing will be approximately 2,369,756 gallons for the 250 MW project. (This estimate is based on: a water usage rate of 1/8 gallon per square foot of module area; a total of 908,376 modules; 20.87 square feet per module.) Four panel cleaning cycles per year will use approximately 9,478,904 gallons, or 29.09 acre feet of water.

Overall Operational Water Demands

Water demand for general operational and maintenance activities, such as equipment washing, septic system, and other non-potable uses, is estimated to be approximately 500,000 gallons (1.53 acre feet) of non-potable water annually. This is based on a conservative (high end) consumption rate of 2,000 gallons per MW per year.)

In addition, the sheep used for grazing will each require up to 3 gallons of water per day. Assuming a sheep grazing density of 0.5 sheep per acre over approximately 1,600 acres to be grazed, a total of 800 sheep would be employed. During the course of a 5-month (151-day) grazing period (January through May), the total water requirement for sheep watering would be 362,400 gallons, or 1.11 acre-feet per year.

As discussed above, the washing of solar modules will use approximately 29.09 acre-feet of water annually, based on four washing cycles per year.

Based on the annual water consumption estimates provided above, the combined operational water use by the Grape Solar facility for panel washing (29.09 afy), sheep watering (1.11 afy), and general operational uses (1.53 afy) will total approximately 31.73 acre-feet of water annually over the approximately 1,759-acre project site. This is equivalent to 0.018 acre-feet per acre, or 2.89 acre-feet per quarter-section (160 acres).

Operational water supplies will be provided by Westlands Water District (WWD) through its existing system of lateral pipelines for conveyance of imported surface water. The WWD has established an annual allocation of water deliveries for PV solar projects within its service area. PV solar facilities are eligible to receive up to 5.0 acre-feet per quarter-section per year for operational uses. As noted above, the operational water usage rate at the Grape Solar facility is estimated to be 2.89 acre-feet per quarter-section per year, which is well within the WWD's maximum annual allowance of 5.0 acre-feet per quarter-section.

Small quantities of potable water will be required at the solar facilities for drinking and other uses. Potable water will be delivered to each site by a water delivery service.

Operations Personnel

Facility operations would be conducted by remote monitoring of the solar operation and by on-site maintenance services as needed. It is estimated that the operation of the solar facility will require no more than 10 on-site workers at any given time, as follows. Up to 2 workers will visit the solar facilities periodically to perform inspections, maintenance, and repair work, with additional staff added as needed for major equipment repairs or replacement. Panel washing cycles will involve up to 6 workers for up to 6 weeks per wash cycle, which is expected to occur up to 4 times per year. During the growing season when sheep are grazing on site, up to 2 sheep herders would be required to manage the rotation of sheep flocks through the site.

Security

The perimeter of the solar facility will be securely fenced and gated to prevent unauthorized access, as described under "Perimeter Fencing" above. The facility operator will contract with a private security company to provide security services during construction and operation. Electronic surveillance equipment such as infrared security cameras and motion detectors will be installed around the solar facility, with video feeds transmitted in real time to the off-site security contractor for monitoring. In the event that the surveillance system detects a breach, a security representative will be dispatched to the site, as needed, and the County Sheriff's office will be notified as appropriate.

DECOMMISSIONING AND SITE RECLAMATION

At the end of its useful life, the Grape Solar facility will be decommissioned and the land returned to a farmable state. (It is anticipated that the initial purchase contract for solar generation will have a term of 25 years, although the term could be extended by several years through amendments to the purchase agreement.) Once the solar facility is de-energized, the facility will be decommissioned and the site will be reclaimed in accordance with the Decommissioning and Soil Reclamation Plan required by the County. The Decommissioning and Soil Reclamation Plan will be subject to County approval prior to issuance of a building permit.

Under the Decommissioning and Soil Reclamation Plan, the deconstruction process will involve removal of all solar arrays, equipment, substation, battery containers, concrete pads, electrical cables, fencing, and other material. Equipment and materials will be reused and/or recycled to the extent practicable. Since these decommissioning activities will involve exposure and disturbance of soils, measures for erosion and sediment control will be implemented in accordance with a Storm Water Pollution Prevention Plan (SWPPP) that will be required for decommissioning. Water for dust suppression would also be required, with the overall volume of water required expected to be similar to the volume used during construction. Upon complete removal of equipment and salvageable material, the site will be cleared of any remaining trash and debris.

After the last remnants of the solar facility are removed and hauled off-site, the land will be tilled to restore the soils to a density and consistency suitable for farming. Finally, the site will be reseeded with an appropriate weed-free seed mix in order to provide soil stability and moisture retention prior to the resumption of farming.

It is expected that the decommissioning of the Grape Solar facility will involve a similar level of activity as the original project construction, since it will essentially involve construction in reverse or deconstruction. Decommissioning may involve less equipment use and fewer material deliveries, and the time required for decommissioning may be less than the duration of the original project construction.

2.3. SURROUNDING LAND USES AND SETTING

The lands surrounding the Grape Solar project site consist mainly of agricultural lands along with related irrigation canals, ditches, wells, pump stations, power lines, and farm roads (see Figure 3 – Project Vicinity). Other land uses within four miles of the project site consist solely or ranches and agricultural dwellings. Within this radius, the nearest habitable structures include the following: 1) Three ranch complexes (with a total of eight dwellings) located 0.5 miles east, 1.0 miles southeast, and 1.5 miles northeast of the site along the east side of SR-41; 2) Five dispersed agricultural residences located 2.2 to 3.9 miles northeast of the project site along 22nd Avenue; 3) The Shannon Ranch complex (including 20 dwellings) located 2.5 miles northwest; and 4) The Stone Land Company Ranch (with 2 dwellings) located 3.4 miles west along Nevada Avenue.

The nearest population centers include the community of Stratford located 4 miles northeast, the City of Lemoore located 10 miles northeast, the Santa Rosa Rancheria located 8.3 miles east, the City of Huron located 10 miles west, and the community of Kettleman City located 9 miles south. Naval Air Station Lemoore (NASL), and its associated base housing, is located 6.6 miles north of the Grape Solar project site. The Grape Solar Project is partially located within an NASL Arrival Flight Track, and is also within the Military Influence Area for NASL.

2.4. RELATED PROJECTS

Approved and Pending Solar Projects

Related projects include 31 solar PV generating projects that have approved or pending Conditional Use Applications in unincorporated areas of Kings County, for a total potential generating capacity of 2,658 MW. To date, a total of 27 solar PV projects, with a total generating capacity of 1,828 MW, have been approved by Kings County. Of these, 24 solar projects have been completed or partially completed, for a total of 1,425 MW. The 3 remaining approved (but not yet constructed) solar projects have a total potential generating capacity of 403 MW. These include the 250 MW Solar Blue Project located adjacent to the northwest, the 150 MW Chestnut Solar Project located adjacent to the north, and the 3 MW Leo Solar Project located in southern Kings County. An additional four solar PV projects, with a potential generating capacity of 830 MW, have pending CUP applications with Kings County, including the subject 250 MW Grape Solar Project, the 250 MW Cherry Solar Project located across Nevada Avenue to the south, and the 130 MW Alamo Springs Solar Project and 200 MW Pelican's Jaw Solar Project, both located in southern Kings County. These related projects are considered in detail in the cumulative impact analysis in section *4.21. Mandatory Findings of Significance*. A table listing the details of these "cumulative projects" (Table 12) is contained in section 4.21, along with an exhibit (Figure 10) showing the location of each.

Westlands Solar Park Master Plan

The Grape Solar Project site lies within the boundaries of the Westlands Solar Park Master Plan area, which encompasses approximately 20,938 acres located to the north, west, and south of the project site. As discussed in Chapter *1. Introduction*, the Master Planning process and associated programmatic CEQA review for the Westlands Solar Park (WSP) Master Plan and Gen-Tie Corridors Plan was completed in January 2018. This master planning process embodied a comprehensive approach for the long-term solar development of the Plan Area and the establishment of the planned gen-tie corridor for transmission of WSP solar generation to the State electrical grid. The Master Plan EIR provides program-level CEQA review for the WSP Master Plan and the Gen-Tie Corridors to the Gates Substation. As individual solar projects are brought forward under the Master Plan, each project will be subject to CUP approval and project-specific CEQA review by Kings County, which will be accomplished through the preparation of Initial Studies/Mitigated Negative Declarations (IS/MNDs). As discussed in Chapter *1. Introduction*, these subsequent IS/MNDs are intended to be tiered from the WSP Program EIR, as provided under CEQA. The environmental analysis in the PEIR provides an evaluation of the impacts of WSP solar development, as well as a comprehensive analysis of cumulative impacts associated with WSP development combined with other cumulative development in the Master Plan area. The cumulative analysis is updated in this MND (see Section 4.21) to reflect additional pending and approved projects which have been brought forward since the Program EIR was certified in January 2018.

2.5. OTHER PERMITS AND APPROVALS THAT MAY BE REQUIRED

The following permits and approvals for the Grape Solar Project may be required from Kings County and other permitting agencies:

County of Kings

- Tentative Parcel Maps (or Lot Line Adjustments) to create parcels corresponding to the project boundaries
- Encroachment Permits for work in County road rights-of-way, and for utility crossings at County roads.
- Transfer Permits obtained from Kings County Public Works Department for oversized or excessive loads on County Roads.
- Building Permits for all aspects of project construction.

Other Agencies

- San Joaquin Valley Air Pollution Control District (SJVAPCD): 1) Indirect Source Review (ISR) under Rule 9510; 2) Approval of construction Dust Control Plans under Regulation VIII; 3) Portable Equipment Registration, under Rule 2280, for portable generators and compressors used during construction; 4) Permit to Operate, under Rule 2010, for any equipment greater than 50 horsepower resulting in emissions, e.g., standby generators.
- Regional Water Quality Control Board – Central Valley Region (CVRWQCB): 1) Administration of General Permit for Storm Water Discharges Related to Construction Activities under the National Pollutant Discharge Elimination System (NPDES), including oversight of Storm Water Pollution Prevention Plans (SWPPPs); 2) Issuance of a Waste Discharge Requirement (DWR) under the State Water Code for any fills placed in Waters of California, which may be required for any potential canal crossings which involve placement of fill within the banks of an active canal for a bridge or culvert.
- State Water Resources Control Board (SWRCB): As the agency with primary jurisdiction for NPDES permitting in California, applicants for projects subject to the Storm Water General Permit (referenced under Regional Water Quality Control Board above) are required to file a Notice of Intent (NOI) with the SWRCB indicating the intent to comply with the General Permit and to prepare a SWPPP.
- California Department of Transportation (Caltrans): Single-trip transportation permits for oversized loads on State highways. Permits are issued in coordination with the California Highway Patrol.
- California Public Utilities Commission (CPUC): Sole authority for approval of electrical system improvements to be constructed, owned or operated by PG&E, including substations, switching stations, and interconnections, under CPUC General Order No. 131-D. (Note: Since all elements of the Grape Solar Project, including the on-site substation are planned to be privately owned, the CPUC will have no jurisdiction over these project elements. The Point of Interconnection (POI) to the State electrical grid and the PG&E system will be at the Gates Substation in Fresno County. The solar generation from the project will be conveyed to the Gates Substation by a 230-kV gen-tie line, which will also be privately owned.)

CHAPTER 3 – ENVIRONMENTAL DETERMINATION

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project involving at least one impact that is a "Potentially Significant" as indicated by the checklist on the following pages.

	Aesthetics	X	Agriculture and Forestry Resources
X	Air Quality	X	Biological Resources
X	Cultural Resources		Energy
X	Geology/Soils		Greenhouse Gas Emissions
X	Hazards and Hazardous Materials	X	Hydrology/Water Quality
	Land Use/Planning		Mineral Resources
	Noise		Population/Housing
	Public Services		Recreation
X	Transportation		Tribal Cultural Resources
	Utilities/Service Systems		Wildfire
	Mandatory Findings of Significance		

DETERMINATION:

On the basis of this initial evaluation:

____ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

__X__ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the proposed proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

____ I find that the proposed project MAY have a significant effect on the environment and an ENVIRONMENTAL IMPACT REPORT is required.

____ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measure based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

____ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been adequately analyzed in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable legal standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measure that are imposed upon the proposed project, nothing further is required.

Signature: Chuck Kinney Date: 3-12-21

Chuck Kinney, Deputy Director – Planning
Kings County Community Development Agency

CHAPTER 4 – EVALUATION OF ENVIRONMENTAL IMPACTS

4.1. AESTHETICS

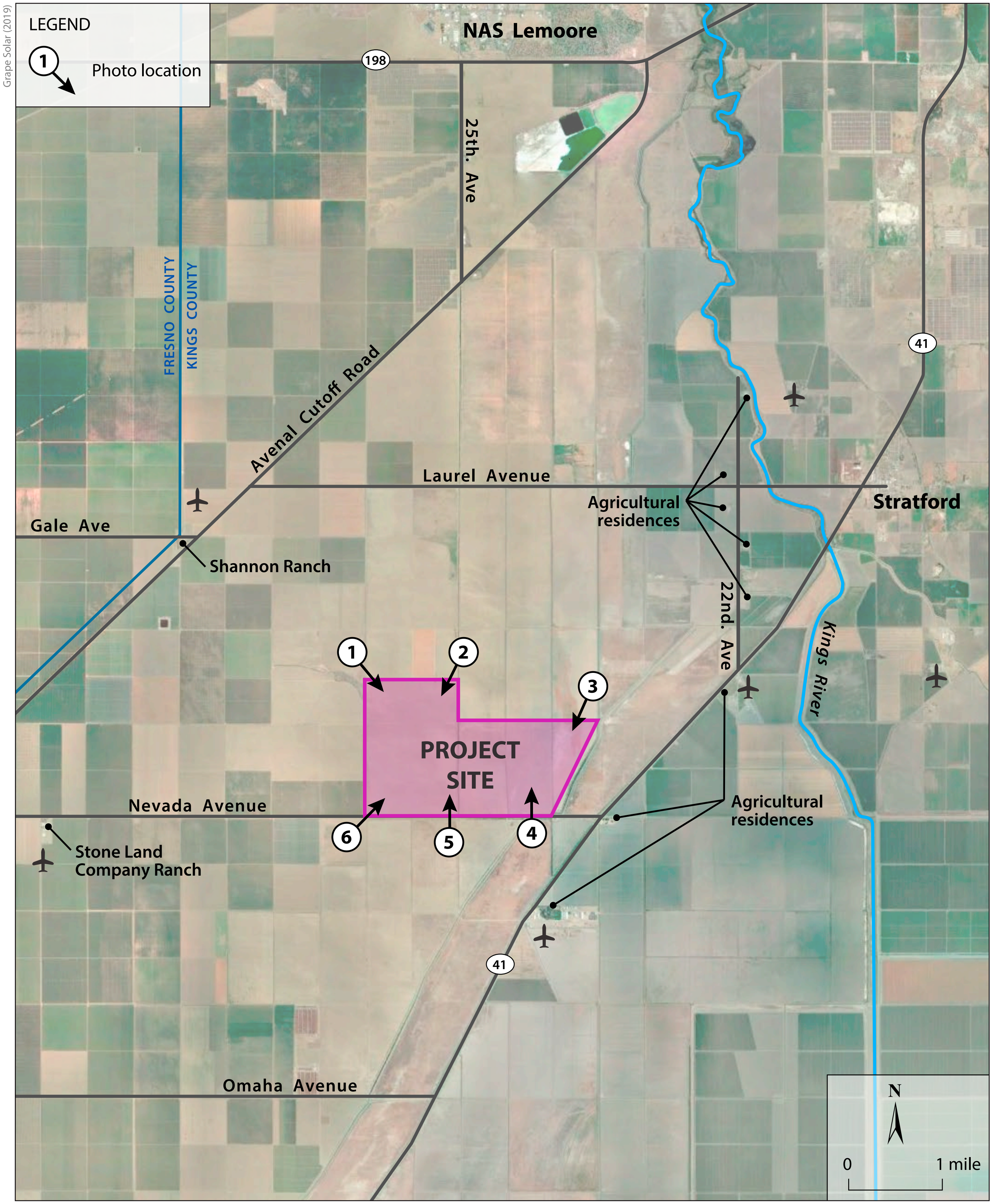
Would the project:		Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant	No Impact
a)	***Have a substantial adverse effect on a scenic vista?***	☐	☐	■	☐
b)	***Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?***	☐	☐	☐	■
c)	***In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?***	☐	☐	■	☐
d)	***Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?***	☐	☐	■	☐

Setting

The 1,759-acre project site consists entirely of agricultural fields with no buildings or trees (see Figures 7a through 7d – Site Photos). The 70-kV Henrietta to Tulare Lake sub-transmission line runs through the center of the site from north to south along the 25th Avenue alignment. An agricultural irrigation canal also runs through the center of the site alongside the 25th Avenue alignment, and large canal (the Empire Westside Main Canal) runs parallel to the east site boundary at a distance of 50-300 feet east of the site. Smaller irrigation canals and run through the eastern portion of the project site in a north-south direction.

The lands surrounding the Grape Solar project site consist mainly of agricultural lands along with related irrigation canals, ditches, wells, pump stations, power lines, and farm roads (see Figure 3 – Project Vicinity). Other land uses in the project vicinity consist of farming operations centers and agricultural dwellings. The nearest habitable structures include the following: 1) Three ranch complexes (with a total of eight dwellings) located 0.5 miles east, 1.0 mile southeast, and 1.5 miles northeast of the site along the east side of SR-41; 2) Five dispersed agricultural residences located 2.2 to 3.9 miles northeast of the project site along 22nd Avenue; 3) The Shannon Ranch complex (including 20 dwellings) located 2.5 miles northwest; and 4) The Stone Land Company Ranch (with 2 dwellings) located 3.4 miles west along Nevada Avenue. .

The nearest population centers include the community of Stratford located 4 miles northeast, the City of Lemoore located 10 miles northeast, the Santa Rosa Rancheria located 8.3 miles east, the City of Huron located 10 miles west, and the community of Kettleman City located 9 miles south. Naval Air Station Lemoore (NASL), and its associated base housing, is located 6.6 miles north of the Grape Solar project site.



Source: Google Earth

Site Photos - Key Map

Figure 7a

Photo 1: Southeastward view from northwest corner of site.

Photo 2: Southern view from north site boundary at 25th Ave.

Photo 3: Southwestward view from northwest corner of site.

Site Photos

Figure 7b

Photo 4: Northward view from southeast corner of site.

Photo 5: Northward view from southern site boundary at 25th Ave.

Photo 6: Northeastward view from southwest corner of site.

Site Photos

Figure 7c

There are several completed solar generating facilities in the project vicinity, including: the Kettleman Solar facility located 5.0 miles south; the Kent South, Orion, Mustang and Westside Solar (Phase 1) facilities located 4.0 to 6.5 miles north. There are also two solar projects which have been recently completed, including: American Kings (4.2 miles north); Mustang 2 (2.5 miles north); and two solar projects which are currently under construction, including Aquamarine (1.0 miles north) and Slate (2.6 miles north). In addition, there are two approved solar projects in the vicinity, including: Solar Blue (1.0 miles north), and Chestnut (adjacent to the north). It is anticipated that the construction of latter four solar projects will be completed by the time the Grape Solar Project begins construction.

Other visually prominent features in the project vicinity include Highway 41 and the adjacent Blakely Canal, located 0.5 miles east, and the Kings River which is contained in an artificial channel running approximately 2 miles east of the project site.

The Open Space Element of the 2035 Kings County General Plan describes the important scenic resources of the County. The key landscape features include the Kings River to the east and the foothills and mountains in the western portion of County. The project site is 2 miles west of the Kings River, which is contained in an artificial channel with no riparian vegetation in the reach nearest to the project site. The natural river channel and adjacent riparian corridor terminates approximately 3 miles northeast of the project site at the SR-41 bridge. At this distance, the project site is not integral to, nor does contribute to, the scenic value of the river or its riparian corridor (Kings County 2010c).

In the distance to the southwest the foothills and mountains of the Coast Ranges are visible from the project site. The Kettleman Hills rise to an elevation of about 1,200 feet at a distance of approximately 12 miles from the project site. Beyond these foothills, first ridge of the Coast Ranges reaches elevations of approximately 4,400 feet at a distance of about 45 miles. At these distances, the foothills and mountains make up a very small portion of the overall field of view from the project site.

There are no State, County or City-designated or proposed scenic highways or routes in the project vicinity. The only recognized scenic route in the County is the segment of SR-41 running through the southwest corner of the County as it enters the Coast Ranges just west of SR-33, approximately 19 miles southwest of the project site, and continues southwestward to the Kern County line and then on San Luis Obispo County. None of the roadways in the project vicinity are designated or proposed scenic routes.

Environmental Evaluation

a) Would the project have a substantial adverse effect on a scenic vista?

Less-than-Significant Impact. The Grape Solar Project site consists of essentially flat agricultural land that is typical of the valley floor, with no topographic variation or features to provide visual interest or vantage points for panoramic views. The nearest locally significant scenic resource is the Kings River, of which the nearest natural channel and adjacent riparian corridor is located approximately 3 miles from the Grape Solar Project site, and not within view of the project site. The only potential scenic vistas in the region are of the Kettleman Hills and Coast Ranges to the west and southwest. The low profile of the mountain ridgeline can be discerned on the distant horizon at least 12 miles from the Grape Solar project site, and this comprises a very small portion of the overall southwesterly view from the project vicinity. The Grape Solar Project's solar arrays will not exceed 8 feet in height, thus would not block publicly accessible views of the western hills from SR-41, which is at least a half-mile east of the project site. From Nevada Avenue, views of the distant ridgeline would not be obstructed since the Grape Solar Project would be located north of the Nevada Avenue and thus would not block views to the west or southwest toward the Coast Ranges. Therefore, the impacts of the Grape Solar Project on scenic vistas would be *less than significant*.

b) Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

No Impact. There are no State or County-designated or proposed scenic highways or routes in the vicinity of the Grape Solar Project site (the nearest proposed scenic highway segment is 19 miles southwest of the project site), nor are there any recognized scenic resources or vistas in the immediate area (Caltrans 2011, Kings County 2010c). Additionally, there are no rock outcroppings or significant trees on the project site or in the surrounding area. Similarly, there are no historic buildings on the Grape Solar Project site or in the vicinity that are listed in the Kings County General Plan Resource Conservation Element (Kings County 2010b) or elsewhere. In summary, there are no known scenic resources that would be substantially damaged by the construction of the Grape Solar Project, and there would be *no impact* on such scenic resources.

c) In non-urbanized areas, would the project substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

Less-than-Significant Impact. The Grape Solar Project would involve installation of solar arrays throughout the 1,759-acre project site. The solar arrays would be relatively low in profile, reaching a height of about 8 feet at maximum tilt. The inverters and transformers that would be dispersed throughout the site would also have a maximum height of about 8 feet, and the meteorological station would reach a height of about 11 feet. The O&M building, substation, and battery storage facilities would located together within an approximately 7.5-acre area located northeast of the intersection of Nevada Avenue and the 25th Avenue alignment. The O&M building would be 14 feet tall at the roofline, and the battery storage containers would be 8.5 feet in height. The tallest structural elements at the on-site substation would include dead-end structures up to 75 feet high, and a potential communications tower could reach 70 feet in height. The solar facilities would be surrounded by perimeter fencing with an overall height of about 8 feet.

The Grape Solar Project would replace the agricultural fields of the site with the relatively low profile structural elements of a solar generating facility. The rows of solar panels would be similar in scale to rows of tall corn or permanent tree crops. The hard edges of the solar equipment would contrast with the softer edges of the planted crops, but would not introduce a new dominant visual element that is substantially out of scale with its surroundings. In addition, over 90 percent of the project would be retained in vegetated ground cover, which would help visually integrate the project with its rural surroundings.

Although the project setting is predominantly rural and agricultural, there are existing structural elements in the immediate vicinity. These include the following: the Westside Solar Project Phase 1 located at the southwest corner of Avenal Cutoff Road and 25th Avenue; the Kent South solar facilities, substation, and switching station at the northwest corner of Avenal Cutoff Road and 25th Avenue; the American Kings and Mustang 2 solar projects near Avenal Cutoff Road and 25th Avenue;

the Henrietta substation and adjacent power plant to the north along 25th Avenue; and the former agricultural processing plant located on 25th Avenue just north of Avenal Cutoff Road. In addition, there are several approved solar projects in the vicinity, including the Westside (Phase 2), Aquamarine, Solar Blue, and Chestnut Solar Projects nearby to the north. The latter four solar projects would be completed by the time the Grape Solar Project begins construction. Therefore, the project would not introduce new structural elements to the area.

As discussed under 'Setting' above, the visual quality of the project site and its surroundings is relatively low. The land itself is flat and featureless, and the area is not part of a recognized scenic resource. The number of visual receivers in the area, who would experience the visual changes resulting from the project, is also low. There are no existing residences within at least one-half mile of the Grape Solar Project site, and the views of the project from the nearest ranch dwellings to the east would be blocked by the levees of large intervening canals (Empire Westside Main Canal and Blakely Canal), which are elevated topographically relative to the ranch complex and thus would interrupt westward sightlines toward the project. The next nearest ranch dwellings, located one mile southeast and 1.5 miles northeast, are visually distant and also blocked by levees of the same large canals. All other residences are at least two miles from the Grape Solar Project site. Therefore, no residential views would be affected by the project. The only public road that passes alongside the project site is Nevada Avenue, which runs along the southern project boundary for two miles. Motorists traveling along Nevada Avenue would have near-ground views of solar arrays and the project O&M facilities, substation, and battery storage facilities. Nevada Avenue is very lightly traveled, so the number of passing motorists who would have visual contact with the project along this roadway would be small. The next nearest public road – SR-41 to the east – is located one-half mile from the nearest project boundary. From this distance, the solar arrays of the completed project would not be visible, and the taller structural elements of the project substation may be barely visible as narrow profile vertical features on the horizon.

The Grape Solar Project would result in a visual change of the project site from agricultural to solar generating facility. While this would represent a visual change to the project site, it would not result in a substantial visual change to the surrounding area which already includes several solar generating facilities, and will be joined by three additional approved solar facilities which will be completed before the Grape Solar Project is constructed. Given the relatively low visual quality of the site and its surroundings, and the very low number of visual receivers who would experience the change in visual setting, the introduction of a non-agricultural land use as represented by the Grape Solar Project, within a visual setting that includes considerable existing and approved structural elements, would not substantially degrade the visual character or quality of public views of the site and its surroundings. Therefore, the visual impacts associated with the Grape Solar Project would be *less than significant*.

d) Would the project create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?

The topics of lighting and glare are discussed separately below.

Lighting

Less-than-Significant Impact. Under existing conditions, the project vicinity is subject to night lighting from mainly from headlights from vehicles traveling on SR-41 and to a lesser extent Nevada

Avenue. The Grape Solar Project will introduce new sources of light to the area, although permanent exterior lighting will be mainly located at the site entrances, the operations yard, and the on-site substation. Lighting within the solar fields will be confined to the inverter/transformer pads, which will be activated only when needed by switch or motion sensors. There will be no lighting along any internal access driveways, or around the project perimeter. Permanent lighting would be no brighter than required to meet safety and security requirements, and would be hooded and directed inward and downward to avoid direct illumination of adjacent properties and public rights-of-way.

During the construction phase, the staging areas would have security lighting. Temporary night lighting would be needed if and when construction activity extends into the nighttime hours. As with lighting during facility operations, the temporary lighting would provide the minimum illumination needed and would be directed away from facility boundaries.

Potentially sensitive receptors to unwanted illumination from the project primarily include existing ranch dwellings located on the east side of SR-41. As mentioned, the nearest existing residences are at least one-half mile from the project site and would not be affected by project lighting. The motorists who would travel along Nevada Avenue at night and pass by the project would notice the additional light sources associated with the project, but the volume of this nighttime traffic is very low and the effect would not be significant. Since all lighting within the Grape Solar Project would be directed away from the roadway, the project lighting would not create direct illumination that could pose a safety hazard to passing traffic on Nevada Avenue. Motorists driving along SR-41 at night may notice the project lighting in the distance, but the project lighting would be negligible compared to the glare of headlights from on-coming traffic on the highway.

In summary, the Grape Solar Project would introduce new sources of permanent and temporary nighttime lighting to the project area, although most of the solar facility would not be illuminated. Since there are no residential receivers in the immediate project vicinity, the lighting introduced by the project would have no impact to existing residences. The small number of motorists on Nevada Avenue who would pass by the project site at night would notice an increase in permanent night lighting, but the overall effect would not be significant. The motorists on SR-41 would already be subject to lighting from traffic in this corridor, and thus the subdued project lighting over one-half mile away would not introduce a new source of night lighting to a previously dark rural nighttime setting. Therefore, the lighting impacts resulting from the Grape Solar Project would be *less than significant*.

Glare

Less-than-Significant Impact. Glare is an intense light effect resulting primarily from the reflection of sunlight off reflective surfaces when the angle of the sun to the surface is such that sunlight is reflected toward the receiver, causing potential discomfort or distraction of the receiver, or potential impairment of vision under extreme conditions. The main source of potential glare from the project is solar panels, but other sources can include vehicle windshields and reflective building materials, as well as direct illumination.

All of the solar panels installed at the Grape Solar Project will be composed of photovoltaic cells. Solar PV employs glass panels that are designed to maximize absorption and minimize reflection to increase electricity production efficiency. Untreated silicon reflects about one-third of incoming sunlight. To limit reflection, solar PV modules are constructed of dark, light-absorbing materials, and are given an anti-reflective coating or textured surface. With the addition of the anti-reflective coating or treatment, the reflectivity can be reduced to less than 4 percent of incoming sunlight (EE Times 2012). By comparison, the reflectivity of standard glass is over 20 percent, or about double that of uncoated solar panels. By contrast, concentrating solar thermal systems, which employ arrays of highly polished mirrors to refocus the solar radiation on a receiver tube or tower, reflect about 90 percent of the incoming sunlight (FAA 2018). (The potential for the project to create a source of glint or glare that would affect military pilots stationed at NAS Lemoore is also considered less than significant, and this is discussed in further detail in Section *4.9. Hazards and Hazardous Materials*.)

Further, PV solar systems are designed to maximize absorption of sunlight by keeping the panel surfaces oriented directly to the sun as much as possible. When the sun is high in the sky, sunlight light is reflected skyward. However, when the sun is low in the sky (i.e., at dawn or dusk), the angle of reflectance increases, thereby increasing the potential for reflection at or near ground level. The potential for ground-level reflection is greatest with fixed-tilt solar arrays, which are oriented lengthwise in an east-west direction. When the sun is very low in the sky at sunrise and sunset (i.e., in the east or west), there is a potential for sunlight to be reflected obliquely from the east-west oriented panels at a similarly low angle to observers at ground level. The potential for ground-level reflection is substantially reduced in tracking systems, such as those planned for the Grape Solar Project, which are arranged in north-south oriented rows and allow panels to follow the sun across the sky from east to west. Since tracking systems minimize the angle of incident sunlight at the panel surface, the angle of reflectance is also smaller thus tending to direct reflected sunlight skyward even when the sun is low in the sky. Since tracking systems are arranged in north-south oriented rows, the potential for sunlight to be obliquely reflected to ground level receivers is further reduced since the sun is never low in the sky in a northerly or southerly direction.

Since solar panels are designed specifically to maximize absorption of sunlight and minimize loss of incident sunlight through reflection, the potential for glare is also greatly reduced even during occasional periods when sunlight from module surfaces may be reflected to ground-level receivers. The panels would therefore not be expected to result in intense glare that would adversely affect views in the area or cause discomfort to receivers.

Residences in the vicinity of solar facilities can be subject to potential low-intensity glare from solar panels. However, since there are no existing residences within at least one-half mile of the Grape Solar Project site, there would be no potential glare effects upon residential receivers from the project.

Automobiles passing by the project solar facilities could be subject to low-intensity glare from nearby solar panels at certain times of day. As discussed above, the potential for glare would be greatest at sunrise and sunset when oblique reflections could be received at or near ground level, although ground-level reflection is expected to occur primarily with fixed-tilt mounting systems, and much less so with the tracker systems planned for the project. However, due to the low level intensity of reflection from the PV solar panels and the short duration of driver exposure to any low-intensity reflected light, the very low volume of traffic passing directly by the project on Nevada Avenue would not be subject to significant visual impairment or a safety hazard due to potential glare.

In summary, the potential for glare effects from the project solar facilities to adversely affect daytime views or cause visual impairment would be *less than significant*. (See Section *4.9. Hazards and Hazardous Materials* for discussion of potential glare hazard to aviation.)

REFERENCES – AESTHETICS

Caltrans 2020	California Department of Transportation (Caltrans). 2020. *Scenic Highways*. January. https://dot.ca.gov/programs/design/lap-landscape-architecture-and-community-livability/lap-liv-i-scenic-highways
EE Times 2012	EE Times. 2012. *"Black Solar Cells Have Lowest Reflectance for Silicon Solar Cells."* May 29, 2012. https://www.eetimes.com/black-solar-cells-have-lowest-reflectance-for-silicon-solar-cells/#
FAA 2018	Federal Aviation Administration (FAA). 2010. *Technical Guidance for Evaluating Selected Solar Technologies on Airports*. April. https://www.faa.gov/airports/environmental/policy_guidance/media/FAA-Airport-Solar-Guide-2018.pdf
Kings County 2010b	Kings County. 2010. *2035 Kings County General Plan – Resource Conservation Element*. Adopted January 26, 2010. http://www.countyofkings.com/home/showdocument?id=3112
Kings County 2010c	Kings County. 2010. *2035 Kings County General Plan – Open Space Element*. Adopted January 26, 2010. http://www.countyofkings.com/home/showdocument?id=3114

4.2. AGRICULTURE AND FORESTRY RESOURCES

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection, including the Forest and Range Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.

	Would the project:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant	No Impact
a)	***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)	***Conflict with existing zoning for agricultural use, or a Williamson Act contract?***	☐	☐	■	☐
c)	***Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g)?***	☐	☐	☐	■
d)	***Result in the loss of forest land or conversion of forest land to non-forest use?***	☐	☐	☐	■
e)	***Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?***	☐	☐	■	☐

A comprehensive description of the agricultural setting of the Grape Solar Project area is provided in the certified PEIR on the Westlands Solar Park Master Plan and Gen-Tie Corridors Plan, which is incorporated into this document by reference PEIR pursuant to Section 15150 of the State CEQA Guidelines. The description of the overall agricultural setting is found on pages 3.2-1 through 3.2-20 of the Draft PEIR (WWD 2017c). A description of the specific conditions on the Grape Solar Project site is provided below.

Agricultural Setting

The 1,759-acre Grape Solar project site consists entirely of agricultural fields and supporting features such as, irrigation canals and piping, unimproved farm roads, and electric power lines. In recent years, the site has been cultivated for winter wheat during the wet seasons and left fallow during the dry seasons.

Geomorphology and Soils

The parent materials of the soils in the project area originate from marine sediments of the Coast Ranges formed millions of years ago when these lands were on the seabed. These formations, which primarily consist of fine-grained shales, were uplifted over time, and were then subject to erosional forces which transported these sediments downstream to the west side of the valley where they formed large alluvial fans. The sedimentary formations of the Coast Ranges retained high concentrations of salts resulting from evaporative processes over millions of years. Since these salts are soluble, they were dissolved by rainfall and mobilized in drainage courses that carried the salts downstream to be deposited with the formation of the alluvial fans (Presser 1987, p. 807). These salts include associated trace elements such as selenium (Se), a semi-metallic element which is essential to human health in very small amounts but hazardous to health in concentrations that exceed 30 parts per billion (ppb) (OEHHA 2010).

The geomorphologic processes resulted in the formation of two distinct landform types in the western San Joaquin Valley, including: 1) the upper and middle alluvial fans and fan terrace areas in the higher westerly elevations; and 2) the lower alluvial fans or fan skirts, interfan areas, and basin floors located in the lower lying eastern areas. The project site is located on the lower alluvial fan area which is underlain by clay layers at depths of 10 to 40 feet that impede the downward movement of water (Presser 1987, p. 807). The site area is also characterized by fine-textured clayey soils with low permeability and slow groundwater movement. The upper clay layers combined with the slow draining soils result in a high or "perched" groundwater table that is typically within 5 to 15 feet of the ground surface throughout the project site (WWD 2017a, 2017b).

NRCS Soil Survey

The most recent comprehensive soil survey of Kings County was completed in 1985 by the National Resources Conservation Service (NRCS), formerly the Soil Conservation Service (SCS). According to the Kings County Soil Survey, the Grape Solar Project site includes four different soil types. These soils are listed in Table 5 along with their NRSC land capability classification, Story Index ratings, and Important Farmland Designations under the Department of Conservation Farmland Monitoring and Mapping Program (FMMP), along with brief notes on soil limitations as noted by NRCS.

<u>NRCS Land Capability Classification</u>

Under the soils classification system of the NRCS, soils are classified according to eight broad 'Land Capability' classes, with Class I and II soils being the most fertile and well suited for cultivation, and Class VII and VIII soils having severe limitations for cultivation. According to the NRCS Soil Survey of Kings County, the project site includes four soil types, as follows: Lethent clay loam (64% of site), Twisselman silty clay, saline-sodic (17%), Houser clay, partially drained (10%), and Westcamp loam, partially drained (9%). All of these soils have a Land Capability Class rating of VIIIs or VIIw (non-irrigated) and IIIs or IIIw (irrigated). Class VII soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to pasture, grazing, forestland, or wildlife habitat. Class III soils have severe limitations that restrict the choice of plants or require special conservation practices, or both. The letter "s" indicates that the soil has soil limitations in the root zone such as salinity. The letter "w" indicates excess water such as a high water table. All of the site soils have very slow permeability, and 82 percent of the site soils are also subject to perched or high groundwater (NRCS 1986).

TABLE 5

AGRICULTURAL CAPABILITY OF SOILS ON GRAPE SOLAR PROJECT SITE

Soil Unit	NRCS Map Unit Symbol	Acres in Grape Site (Approx.)	NRCS Land Capability		Storie Index Rating[1]	Important Farmlands Category (Site-Specific)	NRCS Soil Limitations
			Irrigated	Non-Irrigated			
Houser clay, partially drained	126	177	IIIw-6	VIIw	14	Grazing Land[2]	W = excess water such as high water table
Lethent clay loam	139	1,123	IIIs-6	VIIs	41	Grazing Land[2]	S = soil limitations within the rooting zone such as salinity. Groundwater – Perched.
Twisselman silty clay, saline-alkali	166	306	IIIs-6	VIIs	20	Grazing Land[2]	S = soil limitations within the rooting zone such as salinity. Saline = soil contains soluble salts which impair productivity for plants. Sodic/Alkali = sodium content interferes with the growth of most crop plants.
Westcamp loam, partially drained	175	153	IIIw-6	VIIw	49	Grazing Land[2]	W = excess water such as high water table. Groundwater – Perched.
Total Acres		1,759					

[1] Storie Index rating does not consider availability of water supply for irrigation.
[2] Mapped by FMMP as Grazing Land where land has not been irrigated for at least 4 years (see Figure 8).
Sources: NRCS 1986; CDOC 2020.

Storie Index Ratings

The second land capability system applied by NRCS, called the Storie Index, is specific to California. The Storie Index rates the suitability of soils for general intensive agriculture. Soils with a Storie Index rating of 80 or greater are classified as Grade 1 or prime soils. The Storie Index ratings for the soils of the Grape Solar site consist of the following numeric ratings and a corresponding numeric grades: Houser clay, partially drained – 14 (Grade 5); Lethent clay loam – 41 (Grade 3); Twisselman silty clay, saline-sodic – 20 (Grade 4); and Westcamp loam, partially drained – 49 (Grade 3) (NRCS 1986).

The saline conditions that are native to the site soils have been exacerbated on the project site by perched groundwater, poor natural subsurface drainage, and the application of insufficient water to leach salt from the root zone. Groundwater in the area is high in salinity, carbonates and bicarbonates, and boron. These groundwater conditions are typically above the maximums recommended for tolerant crops. In addition, the added salts from the groundwater further increase the salinity of the surface soils. Therefore, growing crops on the site utilizing solely groundwater is not feasible.

Soil Impairment Due to Salinity

Under irrigated agriculture, substantial amounts of soluble salts and selenium in the native soils are dissolved and are leached into the groundwater. As discussed, subsurface drainage is restricted due to the presence of clay layers at depth (aquitards) as well as the high clay content of the near-surface soils. With the application of irrigation water, the impedance of downward drainage by the slow draining soils and the underlying clay layers result in rising groundwater levels. The salts and selenium in the near-surface groundwater are transported upward in the soil toward the surface through capillary action, or wicking. When the near-surface water evaporates, the precipitated salts are left behind, resulting in increased salinity in the surface soils (USBR 2006, p. 13-2).

Elevated salt concentration in soil and groundwater tends to inhibit plant growth and reduce yields. Since plants are able to absorb only pure water, the higher the salt concentration, the less water is available to plants, even though the soil may appear wet. This is known as “physiological drought” and has the same effect as an actual drought in terms of starving plants of water needed for growth. There is wide variation in the ability of plants to tolerate saline water, with each plant or crop having different thresholds of salinity tolerance where crop yields begin to diminish rapidly (CSU 2014). Few vegetable and fruit crops have salt tolerances in excess of 3,000 mg/L, and few grains can tolerate salt levels exceeding 6,000 mg/L (FAO n.d., p. 135). In general,

Sampling from perched groundwater (i.e., groundwater in the near-surface soils) conducted by USBR in the mid-2000s found that Total Dissolved Solids (TDS - a measure of groundwater salinity) on the Grape Solar site ranged from 6,000 to 12,000 milligrams per liter (mg/L) (note: 1 mg/L = 1 part per million [ppm]. More recent mapping and soil sampling have shown that salinity levels in the near-surface soils are in the same general range as shown in the 2006 mapping by USBR. A study published by the University of California in 2017 described the results of measurement of salinity concentrations by remote sensing. The UC study showed that salt levels on more than 90 percent of the Grape Solar site are considered “saline” (at over 2,560 mg/L), and over 60 percent of the site soils have salt concentrations greater than 6,400 mg/L, and 2 percent of site soils have salt concentrations greater than 12,800 mg/L (Cal Ag 2017). Additionally, soil samples on the nearby Aquamarine Solar Project site (located one mile north of the Grape Solar site and composed predominantly of the same Lethent clay loam that covers 64 percent of the Grape Solar site), found salt concentrations to range from approximately 4,400 mg/L to over 20,000 mg/L on that site (Kings County 2019b). Due to the very high salt concentrations in the soils of the Grape Solar Project site and surrounding lands, the predominant crop grown on the project site and other WWD-owned impaired farmlands nearby is winter wheat, which can be grown without irrigation in soils with salinity levels of 6,000 mg/L with only a 10 percent decrease in crop yield (CSU 2014). In 2018 and 2019, winter wheat was the only crop grown on the Grape Solar site and other retired farmlands owned by WWD in Kings County.

Irrigation Water Supply Constraints

Historically, irrigation water for the project site has been largely provided by imported surface water delivered through the Westlands Water District (WWD). However, in the early 2000s, the WWD acquired all of the lands of the project site and retired them from irrigated agriculture due to drainage impairment and high salinity levels. Since then, no imported surface water or pumped groundwater has been applied on the site, although dry farming for winter wheat continues on lands leased to area growers. If the project lands were not retired and still eligible to receive imported water deliveries, the maximum water allocation available to the site for agricultural purposes from the federal Central Valley

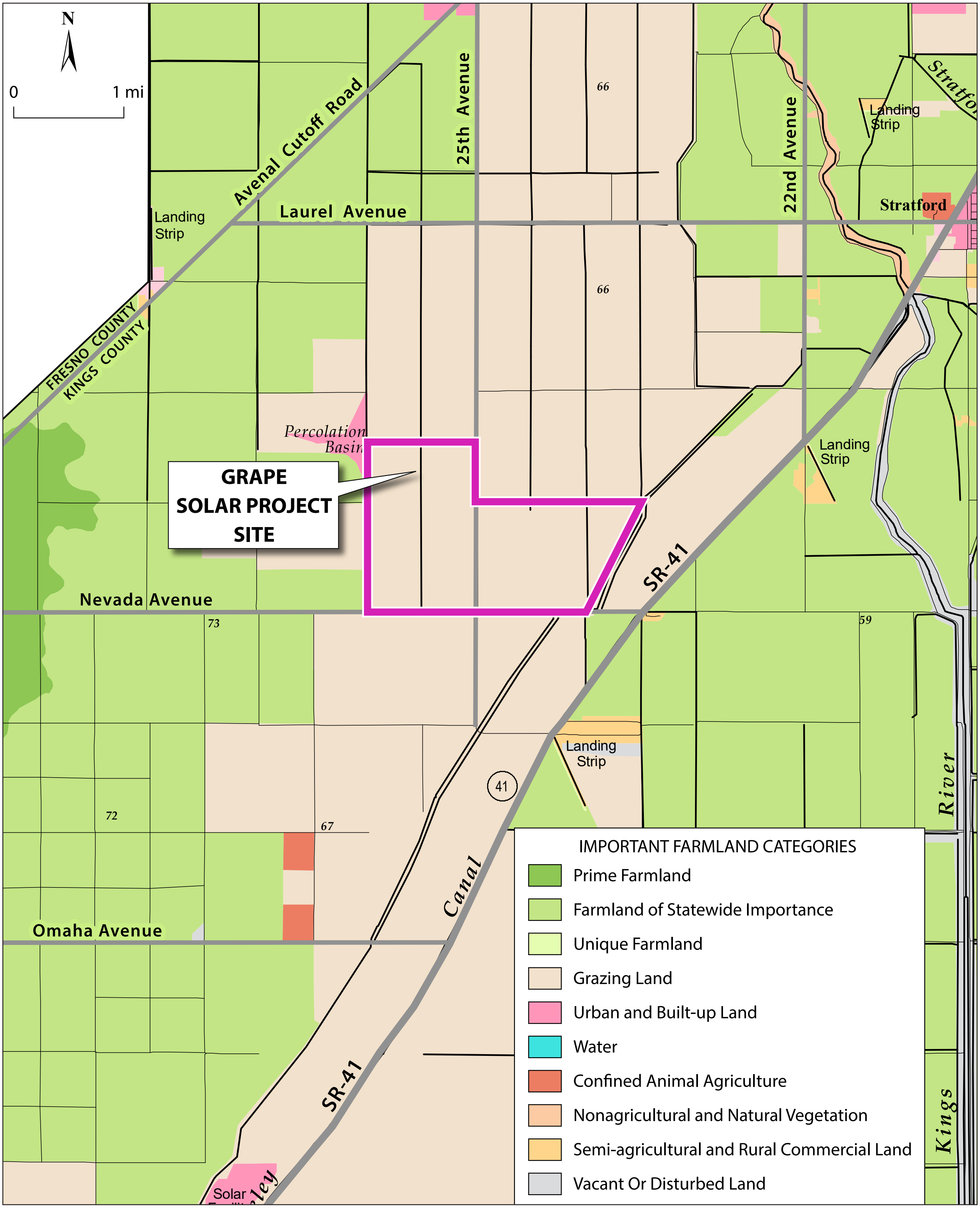
Project (CVP) would be approximately 2.6 acre-feet per acre per year. (Note: The maximum allocation for agricultural uses is not the same as the maximum allocation for non-agricultural uses, also known as Municipal and Industrial (M&I) uses, which is 5 acre-feet per 160 acres for solar facilities, as discussed in section *2.2. Project Description*.) During the mid-2010s, the actual deliveries of CVP contract water to WWD were dramatically curtailed due to prolonged drought conditions. Also, since WWD was one of the last water districts to be provided with federal water, it has a junior entitlement to CVP water, which places it at a very low priority for water deliveries during times of scarcity. During the last 10 years (between 2010 and 2019), WWD received an average of 42 percent of its contract water, and early estimates of available water for 2021 indicate that only 20 percent of CVP contract water will be available to WWD growers.. In 2014 and 2015, WWD received 0 percent allocation of CVP water, and in 2016 received 5 percent of its contract water (WWD 2020). In order to meet the irrigation requirements of planted crops under such drought conditions, private landowners on non-WWD-owned lands augment reduced surface water supplies with pumped groundwater. But since the groundwater is high in salinity, the amount of groundwater that can be blended with the higher quality imported surface water is limited by the generally low salinity tolerance of crops. Due to the unavailability of imported surface water during the critically dry years of 2014 and 2015, combined with the quality and quantity constraints on groundwater pumping, approximately 220,000 acres were fallowed within the District during both of those years, representing 40 percent of the irrigable farmland in the District (WWD 2020).

In January 2020, the WWD Board of Directors adopted the Groundwater Sustainability Plan (GSP) for the 622,215-acre Westside Subbasin (this includes the entire WWD service area of 614,700 acres). The GSP determined that the current safe yield across the subbasin is 270,000 acre-feet per year (DWR 2020a, p. ES-6). The groundwater allocation program established under the GSP includes a "transition period" from 2022 to 2030, in which a uniform annual allocation is initially established at 1.3 acre-feet per acre and then subsequently reduced each year by 0.1 AF per acre until 2030 when the allocation would reach 0.5 AF per acre. The groundwater will be distributed based on per-acre land ownership for all qualifying lands. For purposes of this analysis, the available groundwater supply is defined as 0.5 AF per acre per year. (See Section *4.10. Hydrology and Water Quality*, item 'e', for a full discussion of WWD's Groundwater Sustainability Plan.)

Farmland Mapping and Monitoring Program

The California Department of Conservation (CDOC) administers and maintains the statewide Farmland Mapping and Monitoring Program (FMMP), under which farmland is mapped by several categories including Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Grazing Land. The first three of these categories are identified as "Farmland" in CEQA Guidelines Appendix G (see item 'a' under Environmental Evaluation below). Figure 8 shows the most recent edition of the Important Farmland Map published by CDOC for areas of Kings County that include the Grape Solar Project site and surrounding areas. As shown, the entire 1,759-acre project site is mapped as "Grazing Land," which is defined as land on which the existing vegetation is suited to the raising of livestock (CDOC 2020). Grazing Land is not included among the categories that define "Farmland" in CEQA Guidelines Appendix G.

Grape Solar (2019)/Important Farmlands



Source: CDOC, 2020

Important Farmlands

Figure 8

Williamson Act

The California Land Conservation Act of 1965, commonly referred to as the Williamson Act, enables local governments to enter into contracts with private landowners for the purpose of restricting the use of those lands to agricultural or compatible uses. There are two types of contracts available, including Land Conservation contracts, which have a term of 9 years, and Farmland Security Zone (FSZ) contracts, which have a term of 18 years. In return for placing their lands under these contracts, the restricted parcels are assessed at reduced valuations and therefore are subject to lower property taxes. The Williamson Act stipulates that local governments adopt rules governing the administration of agricultural preserves, including rules related to compatible uses, provided the rules are consistent with the following principles of compatibility (Gov. Code § 51231).

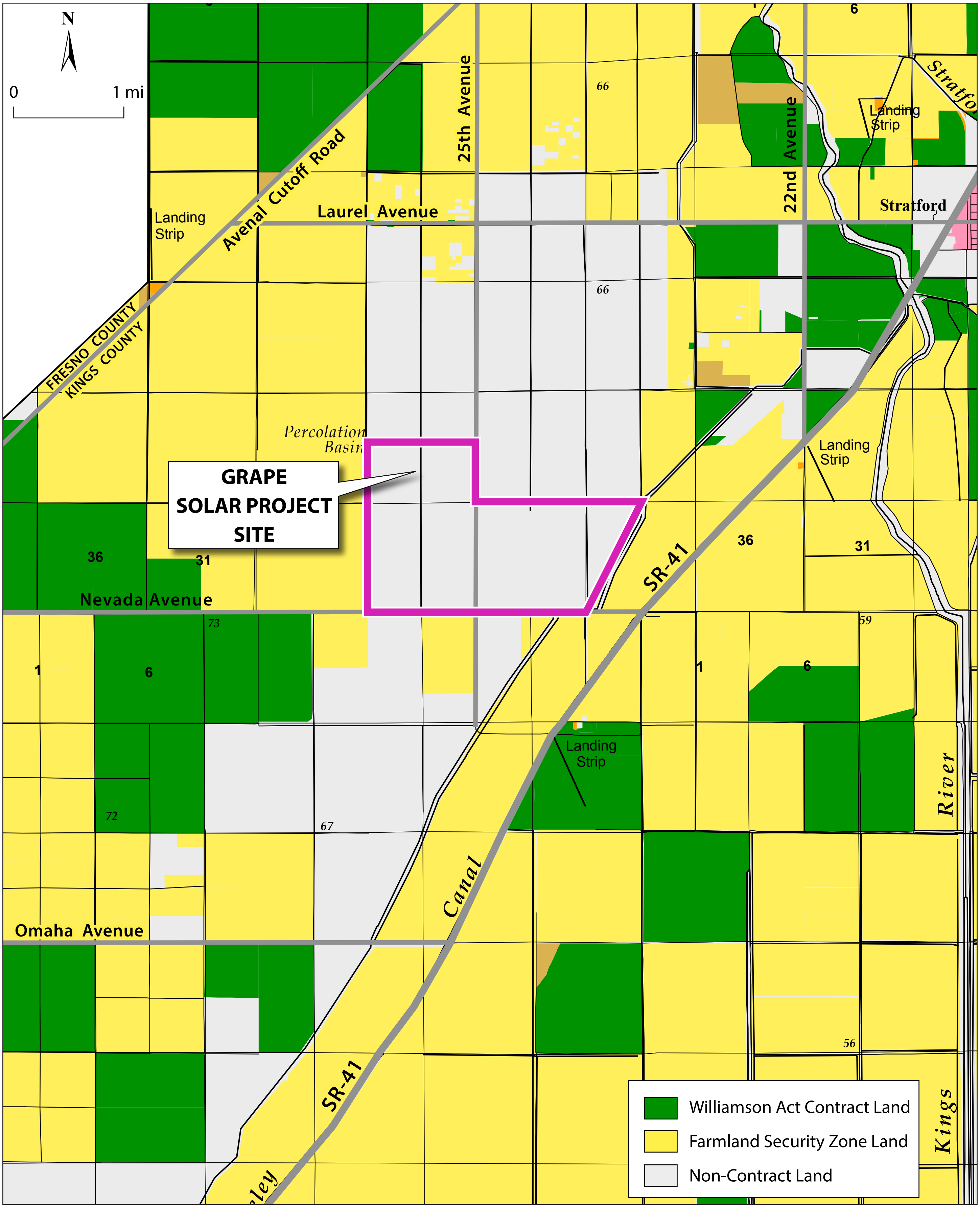
Gov. Code § 51238.1. (a) Uses approved on contracted lands shall be consistent with all of the following principles of compatibility:

> *(1) The use will not significantly compromise the long-term productive agricultural capability of the subject contracted parcel or parcels or on other contracted lands in agricultural preserve.*
> *(2) The use will not significantly displace or impair current or reasonably foreseeable agricultural operations on the subject contracted parcel or parcels or on other contracted lands in agricultural preserves. Uses that significantly displace agricultural operations on the subject contracted parcel or parcels may be deemed compatible if they relate directly to the production of commercial agricultural products on the subject contracted parcel or parcels or neighboring lands, including activities such as harvesting, processing, or shipping.*
> *(3) The use will not result in the significant removal of adjacent contracted land from agricultural or open-space use.*

The Kings County Assessor's records indicate that no portion of the Grape Solar Project site is subject to Land Conservation Contract or Farmland Security Zone Contract under the Williamson Act. With one exception, all of the project parcels were acquired in lieu of eminent domain by Westlands Water District in the early 2000s, for the purpose of retiring these drainage-impaired farmlands from irrigated agriculture. (Note: The project site includes one small 6.5-acre parcel which is not owned by WWD but which is not under either form of Williamson Act contract.) Government Code Section 51295 provides that Williamson Act contracts (including Farmland Security Zone contracts) on lands acquired by a public agency in lieu of eminent domain are deemed null and void at the time of the acquisition. This is reflected in the California Department of Conservation mapping of Williamson Act contracts in Kings County (see Figure 9) which indicates that there are no contracts in effect within the boundaries of the Grape Solar Project. At such time as the ownership of the WWD-owned parcels is transferred to the project applicant for purposes of solar development, the transferred parcels will be re-enrolled in the Williamson Act program as required under Government Code Section 51295.

Kings County Priority Agricultural Land Model

The Kings County Community Development Agency has developed a model which considers additional factors in defining the value of farmlands in order to rank County farmlands on a priority basis. The factors considered in the model include soil classification, crop value, availability of water resources, the need for open space buffers between urban areas, and the planned orderly growth of communities. The resulting mapping of Priority Agricultural Land, as mapped in the General Plan Resource Conservation Element (Figure RC-13) shows the following priority categories on the Grape Solar Project site: easterly 120 acres – "Low-Medium Priority"; westerly 1,639 acres – "Low Priority" (Kings County 2010b).



Source: CDOC, 2015

Williamson Act Contract Lands

Figure 9

2035 Kings County General Plan

The Land Use Map of the 2035 Kings County General Plan Land Use Element shows the land use designation on the eastern-most 536 acres of the Grape Solar Project site as "Exclusive Agriculture – 40 acre," and the remaining 1,223 acres of the site as "General Agriculture – 40 acre." The General Agriculture designation generally applies to areas south of Kansas Avenue, and the Exclusive Agriculture designation applies to areas within the flight paths of military aircraft based at Naval Air Station Lemoore. Both of these land use designations fall under the broader General Plan category of Agricultural Open Space. In addition to a range of agricultural uses and ancillary activities, the General Plan LU Policy B7.1.3 allows solar voltaic generating facilities within the Agricultural Open Space areas of the County (Kings County 2010a). Energy producing facilities are allowed in the Exclusive Agriculture zone where such facilities would not create a hazard for aircraft, as set forth in RC Policy A1.2.4 (Kings County 2010b).

Kings County Development Code

As designated in the Kings County Zoning Plan, the entire Grape Solar Project site is zoned "AG-40 General Agricultural-40" (Kings County 1964). As provided in Article 4 of the Kings County Development Code, commercial solar photovoltaic electrical generating facilities are permitted in this zoning district subject to a granting of a Conditional Use Permit by the Kings County Planning Commission (Kings County 2016).

Article 11, Section 1112(B)(2) of the Kings County Development Code requires that commercial-scale solar photovoltaic electrical facilities conform to specified standards. Most of these standards relate to agricultural land. The required standards, and the project's conformity with the standards, are addressed in item 'b)' in the Environmental Evaluation that follows (Kings County 2016).

Kings County Right-to-Farm Ordinance

The Kings County Code of Ordinances Section 14-36.1, the "Notice of Disclosure and Acknowledgment of Agricultural Land Use Protection and Right to Farm Policies of the County of Kings" (Right-to-Farm) requires the approvals of rezonings, land divisions, zoning permits, and residential building permits include a condition that notice and disclosure be provided, which is to be recorded with the property title, that specifically acknowledges and notifies all future owners that they are in proximity to agricultural uses, and lists the types of operations and possible nuisances or inconveniences associated with farming such as equipment and animal noises; farming activities conducted on a 24-hour, 7-day a week basis; odors from manure, fertilizers, pesticides, chemicals, or other sources; the aerial and ground application of chemicals and seeds, dust; flies and other insects; and smoke. The ordinance states that the County does not consider normal farming operations involving these activities and effects to be a nuisance, and that current owners and future purchasers should be prepared to accept such annoyances or discomfort from normal, usual, and customary agricultural operations, facilities, and practices. This Right-to-Farm disclosure and acknowledgement establishes the primacy of agricultural operations over other land uses, and would reduce the potential for conflict which could adversely affect the continued viability of such adjacent agricultural operations (Kings County 2002).

Kings County Williamson Act Implementation Procedures

As required under the Williamson Act, the County has established procedures for implementation of the Act at the local level. Those implementation procedures include *Uniform Rules for Agricultural Preserves* *in Kings County*, which identifies the uses that shall be permitted as “Commercial Agricultural Uses,” and “Compatible Uses,” on lands under Williamson Act contracts, including Farmland Security Zone contracts. Permitted compatible uses include single-family residences, accessory structures, agricultural processing facilities, gas and oil wells, and public utility and public service structures and buildings, among other uses.

The current Kings County Williamson Act implementing procedures include the following uniform rules for agricultural preserves that pertain to solar photovoltaic facilities:

> “Commercial solar photovoltaic system facilities that are designed primarily for the production of electrical energy for third party consumption are not compatible under the provisions of Government Code Section 51238.1(a). For purposes of determining compatibility, a project must be determined consistent with the principles of compatibility under Section 51238.1(a). Ordinarily, a solar project will be found compatible if the applicant provides a soil reclamation plan and financial assurances, and if the economic output of agricultural operations on the contracted parcel or parcels on which the project is located will be 90-percent of pre-project output. However, on November 26, 2013, the Board of Supervisors adopted Resolution No. 13-058, recognizing that due to reduced surface water deliveries, poor groundwater quality and severe groundwater overdrafts, impaired soil conditions, and regulatory burdens, circumstances exist on agricultural preserves located within that portion of Kings County south of State Route 198, west of State Route 41, and northeast of Interstate 5 that limit the use of much of the land with the territory for agricultural activities, such that it is reasonably foreseeable that certain parcels located there that currently are used for more intensive agricultural activities will be used in the near future for less intensive uses, including dry farm seasonal grazing. Notwithstanding the present agricultural use of the land, solar farming as a concomitant use with dry farm seasonal grazing or similar commercial agricultural activity may be deemed a compatible use within this region of the County if the applicant provides a soil reclamation plan and financial assurances, and if a finding can be made, based upon substantial evidence, and taking into account surface water availability, ground water quality and availability, and soil conditions, that the proposed concomitant commercial agricultural operation is a reasonably foreseeable use of the land (Kings County 2013).”

As noted previously in this section, no portion of the Grape Solar Project site is subject to Land Conservation Contract or Farmland Security Zone Contract under the Williamson Act. All of the project parcels (except for one 6-acre parcel) were acquired in lieu of eminent domain by Westlands Water District in the early 2000s, for the purpose of retiring these drainage-impaired farmlands from irrigated agriculture. Government Code Section 51295 provides that Williamson Act contracts (including Farmland Security Zone Contracts) on lands acquired by a public agency in lieu of eminent domain are deemed null and void at the time of the acquisition. At such time as the ownership of the WWD-owned parcels is transferred to the project applicant for purposes of solar development, the transferred parcels will be re-enrolled in the Williamson Act program as required under Government Code Section 51295. Therefore, all of the lands within the Grape Solar Project site are assumed to be subject to Williamson Act contracts for purposes of the analysis in this section of the IS/MND.

Environmental Evaluation

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?***

Less-than-Significant Impact. The entire 1,759-acre Grape Solar project site is mapped as "Grazing Land," under DOC's Farmland Mapping and Monitoring Program (FMMP), and no lands are mapped in any of the categories that define "Farmland" under CEQA Guidelines Appendix G (CDOC 2020). Therefore, the impact of the Grape Solar Project on Farmland would be *less-than-significant* and no mitigation would be required for impacts to Farmland. However, in order to ensure that project impacts to agricultural soils of the site are reduced to less-than-significant levels, the following mitigation measures shall be implemented in conjunction with the project.

Mitigation Measure AG-1: Agricultural Management Plan. *Prior to the issuance of a building permit, the applicant shall submit to Kings County an Agricultural Management Plan (AMP) that provides for the ongoing agricultural productivity of the project site for the life of the project. The AMP shall specify that at least 90 percent of this area of the site shall be vegetated with grasses and forbs and shall be managed for dry farm seasonal sheep grazing. The AMP shall include specific provisions for soil preparation and revegetation including specifications for a seed mix which is appropriate to the soil and climatic conditions in the absence of irrigation, methods of avoiding invasive species, and a list of acceptable vegetation that meets the dietary needs of sheep. The AMP shall include detailed provisions to ensure the successful establishment of the planned vegetative cover, and shall identify appropriate maintenance activities, including conditions under which herbicides may be used, and particularly the identification and selection of herbicides that are non-toxic to livestock and wildlife. The AMP shall also prescribe the management practices for sheep grazing. The AMP shall include provisions for ongoing monitoring and annual reporting of agricultural activity on the site to the Kings County Community Development Agency. The AMP shall also comply with the requirements of the Kings County Development Code related to weed abatement and pest control.*

Mitigation Measure AG-2: Soil Reclamation Plan. *Prior to the issuance of a building permit, the applicant shall submit, for review and approval by the Kings County Community Development Agency, a Soil Reclamation Plan (Plan) for the restoration of the site at the end of the project's useful life. The Plan shall contain an analysis of pre-project general pre-construction conditions of the project site, and the site shall be photographically documented by the applicant prior to the start of construction. The Plan shall contain specific measures to restore the soil to approximate its pre-project condition, including (1) removal of all above-ground and below-ground project fixtures, equipment, and non-agricultural driveways, (2) tilling to restore the sub-grade material to a density and depth consistent with its pre-project condition, (3) revegetation using a Kings County-approved grasses and forbs seed mixture designed to maximize revegetation with noninvasive species shall be broadcast or drilled across the project site, and (4) application of weed-free mulch spread, as needed, to stabilize the soil until germination occurs and young plants are established to facilitate moisture retention in the soil. Whether the project area has been restored to pre-construction conditions shall be assessed by Kings County staff. Additional seedlings and applications of weed-free mulch shall be applied to areas of the project* *site that have been determined to be unsuccessfully reclaimed (i.e., restored to pre-project conditions) until the entire project area has been restored to conditions equivalent to pre-construction conditions. All waste shall be recycled or disposed of in compliance with applicable law. The applicant shall verify the completion of reclamation within 18 months after expiration of the project use permit with the Planning Division staff.*

Mitigation Measure AG-3: Financial Assurance. *Prior to the issuance of a building permit, the applicant shall post a performance or cash bond, submit a Certificate of Deposit, submit a letter of credit, or provide such other financial assurances acceptable to the County, in an amount provided in an Engineer's Cost Estimate, approved by the Kings County Community Development Agency, to ensure completion of the activities under the Soil Reclamation Plan. Every 5 years from the date of completion of construction of the project, the applicant shall submit an updated Engineer's Cost Estimate for financial assurances for the Plan, which will be reviewed every 5 years by the Kings County Community Development Agency to determine if the amount of the assurances is sufficient to implement the Plan. The amount of the assurances must be adjusted if, during the five-year review, the amount is determined to be insufficient to implement the Plan.*

b) Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

Less-than-Significant Impact. The following discussion begins with a consideration of the Williamson Act, which is followed by a discussion of the applicable provisions of the Kings County Development Code, which constitutes the County's zoning ordinance.

Williamson Act

As discussed previously in this section, no portion of the Grape Solar Project site is subject to Land Conservation Contract or Farmland Security Zone Contract under the Williamson Act. All of the project parcels (except for one small parcel of 6.5 acres) were acquired in lieu of eminent domain by Westlands Water District in the early 2000s, for the purpose of retiring these drainage-impaired farmlands from irrigated agriculture. Government Code Section 51295 provides that Williamson Act contracts (including Farmland Security Zone Contracts) on lands acquired by a public agency in lieu of eminent domain are deemed null and void at the time of the acquisition. At such time as the ownership of the WWD-owned parcels is transferred to the project applicant for purposes of solar development, the transferred parcels will be re-enrolled in the Williamson Act program as required under Government Code Section 51295. Therefore, all of the lands within the Grape Solar Project site are assumed to be subject to Williamson Act contracts for purposes of the analysis in this section of the IS/MND. As such, the project applicant proposes to avoid any possible conflict with Williamson Act and FSZ contracts by maintaining a use on the site that meets the principles of compatibility pursuant to Government Code Section 51238.1(a) by maintaining reasonably foreseeable agricultural operations on the project site. The project's consistency with the applicable principles of compatibility, as set forth in the Government Code, are discussed below.

Government Code Section 51238.1 (a) Uses approved on contracted lands shall be consistent with all of the following principles of compatibility:

(1) The use will not significantly compromise the long-term productive agricultural capability of the subject contracted parcel or parcels or on other contracted land in agricultural preserves.

Discussion. The productive agricultural capability of the project site would be maintained during the life of the project by implementation of an Agricultural Management Plan (AMP) which specifies the ongoing maintenance of vegetative cover of the site for sheep grazing. Since more than 90 percent of the project site area would be maintained in vegetated cover, the use of the site for solar generation would not prevent the productive concomitant agricultural use of the site during project operation. The very light footprint of the solar generating facility upon the site would allow for the preservation of native soil cover in place and allow for low impact removal of solar arrays and electrical equipment at the end of the facility's productive life. The long-term productive agricultural capability of the project site after decommissioning of the solar generating facility would be ensured through implementation of Mitigation Measure AG-2 which requires implementation of a Soil Reclamation Plan and contains detailed provisions on decommissioning, soil conditioning, revegetation, waste disposal, monitoring, and follow-up measures to ensure that the site has been effectively restored to pre-project conditions.

Solar facility operations would generally involve low levels of on-site activity consisting mainly of occasional visits by maintenance crews, and periodic visits by panel cleaning and vegetation maintenance crews. Traffic generation would be very light, thus minimizing the potential for conflicts with agricultural vehicles and equipment on public roadways. Dust generation during project operations would not occur since the project would include no exposed soils that could be mobilized as windborne dust (e.g., over 90 percent of the site would be vegetated; approximately 9 percent of the site would consist of durable dust free road surface as required by the County's Improvement Standards; and less than 1 percent of the site would be covered by impervious surfaces of equipment pads, the O&M building, battery storage facilities, and the paved project entries and parking areas). The potential introduction of invasive weed species by the project would be minimized through implementation of the Weed Abatement Plan required under Article 11, Section 1112.B.2.e of the Kings County Development Code. The County's Right-to-Farm Ordinance would ensure that adjacent and nearby agricultural operations are not constrained by the need to reduce or eliminate minor incidental effects of cultivation upon adjacent and nearby solar facility operations. During project construction and decommissioning, the disturbance of soil could potentially generate dust. However, these project phases would be temporary in duration, lasting 14 months or less. Thus the impact of potential dust generation on the long-term productive agricultural capability of adjacent and nearby lands would not be significant. The less-than-significant impact with respect to dust generation would be further reduced through implementation of the Dust Control Plan to be approved by the San Joaquin Valley Air Pollution Control District prior to commencement of ground disturbing activities on the project site, pursuant to Air District Rule 8021. In summary, the Grape Solar Project would not compromise long-term agricultural capability on adjacent contracted lands.

(2) The use will not significantly displace or impair current or other reasonably foreseeable agricultural operations. Uses that significantly displace agricultural operations on the subject contracted parcel or parcels may be deemed compatible if they relate directly to the production

of commercial agricultural products on the subject contracted parcel or parcels or neighboring lands, including activities such as harvesting, processing, or shipping.

Discussion. In accordance with Government Code Section 51231, Kings County has adopted procedures for implementing the Williamson Act at the local government level, including rules related to compatible uses that are consistent with the Williamson Act's principles of compatibility. As discussed under 'Agricultural Setting' above, the current Kings County Williamson Act implementing procedures provide the following specific guidance in considering the compatibility of solar photovoltaic facilities in agricultural preserves:

> "Ordinarily, a solar project will be found compatible if the applicant provides a soil reclamation plan and financial assurances, and if the economic output of agricultural operations on the contracted parcel or parcels on which the project is located will be 90-percent of pre-project output. However, on November 26, 2013, the Board of Supervisors adopted Resolution No. 13-058, recognizing that due to reduced surface water deliveries, poor groundwater quality and severe groundwater overdrafts, impaired soil conditions, and regulatory burdens, circumstances exist on agricultural preserves located within that portion of Kings County south of State Route 198, west of State Route 41, and northeast of Interstate 5 that limit the use of much of the land within the territory for agricultural activities, such that it is reasonably foreseeable that certain parcels located there that currently are used for more intensive agricultural activities will be used in the near future for less intensive uses, including dry farm seasonal grazing. Notwithstanding the present agricultural use of the land, solar farming as a concomitant use with dry farm seasonal grazing or similar commercial agricultural activity may be deemed a compatible use within this region of the County if the applicant provides a soil reclamation plan and financial assurances, and if a finding can be made, based upon substantial evidence, and taking into account surface water availability, ground water quality and availability, and soil conditions, that the proposed concomitant commercial agricultural operation is a reasonably foreseeable use of the land (Kings County 2013).

The following is a point by point evaluation of the project's consistency with the above County guidance with respect to the Grape Solar Project.

First, the project site is located within the area identified in Board of Supervisors' Resolution No. 13-058 as being subject to circumstances, such as reduced surface water deliveries and impaired soil conditions that limit the use of much of this land to dry farm seasonal grazing as a reasonably foreseeable use of the land.

Second, as discussed under item 'a)' above, Mitigation Measure AG-2 requires the implementation of a Soil Reclamation Plan for the project, and Mitigation Measure AG-3 requires the provision of financial assurances for implementation of the project Soil Reclamation Plan.

Third, as described in Section *2.2. Project Description*, the project site plan retains permeable soil over 90 percent of the site area, which is to be vegetated with native seed mix for dry farm seasonal sheep grazing (which constitutes a reasonably foreseeable use of the land, as discussed in the first item above).

Fourth, there is substantial evidence that the project site is subject to reduced surface water availability, limitations due to groundwater quality and availability, and impaired soil conditions, such that dry farm seasonal grazing is a reasonably foreseeable use of the land. These conditions are discussed in turn below.

Surface Water Supply. Since the time that Westlands Water District acquired the lands of the project site and retired these lands from irrigated agriculture, the project site has not been eligible to receive surface water deliveries (see "Agricultural Setting" above for a detailed discussion). Therefore, the project site has no access to surface water deliveries for agricultural irrigation.

Groundwater Availability. In January 2020, the WWD Board of Directors adopted the Groundwater Sustainability Plan (GSP) for the 622,215-acre Westside Subbasin (which includes the entire WWD service area of 614,700 acres). The GSP determined that the current safe yield for the subbasin is 270,000 afy per acre (WWD 2019b, p. ES-6). The groundwater allocation program established under the GSP includes a "transition period" from 2022 to 2030, in which a uniform annual allocation is initially established at 1.3 acre-feet per acre and then subsequently reduced each year by 0.1 AF per acre until 2030 when the allocation would reach 0.5 AF per acre. The groundwater will be distributed based on per-acre land ownership for all qualifying lands. For purposes of this analysis, the available groundwater supply is therefore defined as 0.5 AF per acre per year (WRP 2020).

Prior to the retirement of the project lands from irrigated agriculture, the crops typically grown on the project site would have included wheat and cotton, which require approximately 1.5 and 2.0 acre-feet per acre per year of irrigation water, respectively. For comparison, tomatoes and other vegetables require about 1.5 afy per acre, and tree crops require 2.5 to 3.0 afy per acre, while alfalfa hay requires 3.5 afy per acre (WWD 2013). Thus, during years with substantial curtailment of surface water deliveries, groundwater pumping would not provide enough water to make up the difference in supporting any of these crops without exceeding the groundwater extraction limit of 0.5 afy per acre. Overpumping beyond safe yield results in progressive lowering of the water table and is not sustainable.

Groundwater Quality. As shown in the soil and groundwater reports prepared for neighboring projects to the north, groundwater in the project area has high concentrations of sodium, chloride, boron, carbonates and bicarbonates, which limit the volumes that can be applied given the limited tolerance of crops to these elements. Therefore, growing crops utilizing solely groundwater is not feasible.

Soil Conditions. Soils on the project site include Lethent clay loam, Twisselman silty clay, saline-sodic, Houser clay, partially drained, and Westcamp loam, partially drained. When not irrigated, these soils have very severe limitations that make them unsuitable for cultivation and restrict their use mainly to pasture, grazing, forestland, or wildlife habitat. Even if irrigated, these soils would have moderate to severe limitations, reducing the choice of plants that can be cultivated or requiring special conservation practices (NRCS 1986). Soil studies conducted on the area farmlands have determined that the soils of the project site and neighboring sites have very high salt concentrations that place severe limitations on agricultural productivity (Cal Ag 2017). The soil and groundwater reports prepared for neighboring projects confirmed that the native soils of project area have naturally high salt levels, and have been exacerbated by poor natural drainage (see "Agricultural Setting" above for detailed discussion). The short supply of high quality imported water limits the amount of surface water that can be applied to pre-irrigate the soil to leach out some salts. Long term soil salinity conditions are expected to increase due to lack of a subsurface drainage system and a sustainable leachate disposal outlet (Kings County 2019b).

In summary, due to the severe limitation of reliable water availability and significant impairment of soil quality due to high salinity, the project site is not suitable for sustaining long-term agricultural crop production, and a reasonably foreseeable agricultural use of the site would be dry land farming with seasonal grazing.

(3) The use will not result in the significant removal of adjacent contracted land from agricultural or open-space use.

Discussion. The Grape Solar Project is a self-contained solar generating facility and does not include electrical infrastructure with excess capacity that could be used to support similar solar generating facilities on adjacent contracted land. Moreover, the Grape Solar Project is part of the approved Westlands Solar Park Master Plan and Gen-Tie Corridors Plan which has received programmatic CEQA review under a certified Program EIR. As such, additional solar development on adjacent lands is already planned under the Master Plan. The solar projects developed under the Master Plan would be subject to Kings County's Conditional Use Permit requirements, including the implementation of an Agricultural Management Plans (AMPs), as required under Mitigation Measure AG-1, for maintaining dry farm sheep grazing as a concomitant agricultural use. The project CUPs under the WSP Master Plan would also be subject to Mitigation Measure AG-2 which would require implementation of reclamation plans when the solar facilities are decommissioned. With the implementation of these conditions on the WSP solar projects, including the Grape Solar Project, the Williamson Act principals of compatibility for Williamson Act contracts on the project site would be met. As such, the Grape Solar Project would not result in the termination of existing Williamson Act contracts or Farmland Security Zone contracts on adjacent lands.

The Grape Solar Project would not result in the construction of new roadways, beyond internal maintenance driveways for the solar facility. Since the project would not include any excess roadway access or capacity that could serve adjacent contracted land, it would not induce the owners of such lands to remove adjacent contracted lands from agricultural use due to newly available roadway access.

Unlike urban development, the solar generating facility would not induce other development nearby, either for the purpose of providing support services or for taking advantage of services provided by the project. Solar generating facilities neither provide nor require urban services and therefore would not attract or induce other development nearby. Moreover, since such urban development would not be permitted on adjacent or nearby lands under the applicable agricultural zoning, the project would not result in the removal of agricultural preserves from adjacent contracted land through urban growth inducement.

As discussed under item (1) above, the low intensity of solar facility operations would generally minimize the potential for operations-related impacts to adjacent agricultural lands. Therefore, the project would not result in the removal of adjacent contracted land by way of introducing an incompatible land use to the site.

In summary, the Grape Solar Project would be consistent with the Williamson Act principles of compatibility, as further defined by Resolution of the Kings County Board of Supervisors, and therefore would have *no impact* in this regard.

County Zoning

As designated in the Kings County Zoning Plan, the entire site is zoned "AG-40 General Agricultural-40." As provided in Article 4 of the Kings County Development Code, commercial solar photovoltaic electrical generating facilities are permitted in this zoning district subject to a granting of a Conditional Use Permit by the Kings County Planning Commission. Therefore, the Grape Solar Project would be consistent with the County's agricultural zoning for the site upon the granting of the subject Conditional Use Permit for the project.

Article 11, Section 1112(B)(2) of the Kings County Development Code (which is the County zoning ordinance) requires that commercial-scale solar photovoltaic electrical facilities conform to specified standards. Most of these standards relate to agricultural land. The required standards, and the project's conformance with those standards, are addressed in turn below.

a. *The proposed site shall be located in an area designated as either "Very Low Priority," "Low Priority," or "Low-Medium Priority" land according to Figure RC-13 Priority Agricultural Land (2035 Kings County General Plan, Resource Conservation Element, Page RC-20). "Medium Priority" land may be considered when comparable agricultural operations are integrated, the standard mitigation requirement is applied, or combination thereof.*

   Discussion. The General Plan Resource Conservation Element (Figure RC-13) shows the following priority categories on the Grape Solar Project site: easterly 120 acres – "Low-Medium Priority"; westerly 1,639 acres – "Low Priority" (Kings County 2010b). Therefore, the project meets the requirement that solar facilities be located on lands designated as either "Very Low Priority," "Low Priority," or "Low-Medium Priority" agricultural land.

b. *The proposed site shall be located within 1 mile of an existing 60 KV or higher utility electrical line.*

   Discussion. An existing 70-kV sub-transmission electrical line runs through the center of the project site along the unimproved 25th Avenue alignment. Therefore, the project would satisfy the finding that it is located within 1 mile of an existing 60-kV line or higher.

c. *Agricultural mitigation shall be proposed for every acre of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance converted for a commercial solar facility. The agricultural mitigation shall preserve at a ratio of 1:1 an equal amount of agricultural acreage of equal or greater quality in a manner acceptable to the County for the life of the project. Agricultural mitigation on land designated "Medium-High" or higher priority land shall preserve an equivalent amount of agricultural acreage at a ratio of 2:1.*

Discussion. All of the lands within the Grape Solar project site are mapped as "Grazing Land" on the most recent FMMP mapping by CDOC. Therefore, the project would not result in the conversion of any Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use, and no agricultural mitigation would be required. As such, this finding is not applicable to the proposed project.

d. *The project shall include a reclamation plan and financial assurance acceptable to the County that ensures the return of the land to a farmable state after completion of the project life, and retains surface water rights.*

Discussion. As discussed above, Mitigation Measures AG-2 and AG-3 would require a Soil Reclamation Plan along with Financial Assurance to ensure its implementation. The soil reclamation plan and financial assurance would be subject to approval by the County Community Planning Agency prior to the issuance of construction permits. Since the project site has no surface water rights *per se*, there are no surface water rights to be retained. (CVP surface water has historically been supplied to the site by Westlands Water District. However, the eligibility of these lands to receive annual allocations of imported surface water was terminated at the time that WWD acquired all of the lands within the Grape Solar Project site in the early 2000s.) Based upon these facts, the Grape Solar Project will comply with this provision of the Kings County Development Code.

e. *The project shall include a pest management plan and weed abatement plan to protect adjacent farmland from nuisances and disruption.*

Discussion. The project includes the preparation and implementation of a Pest Management Plan and Weed Abatement Plan, as required under the County Development Code. The Weed Abatement Plan would specify that native seed mixes used to revegetate the project site are free of weeds. The plan would also ensure that combustible vegetation on and near the project boundary would be actively managed during the construction and operational phases to minimize fire risk. Vegetation height would be kept low to the ground through sheep grazing and by mowing and trimming with mechanical equipment. The gravel driveways to be constructed around the project perimeter would provide fire breaks. Herbicides would be applied if warranted by site conditions as specified in the Weed Abatement Plan, but would be restricted to those considered environmentally safe. The Pest Management Plan would reduce the potential for pests to inhabit the project site. The Pest Management Plan would set action thresholds, identify pests, specify prevention methods as a first course of action, specify control methods as a second course of action, and establish a quantitative performance goal of nuisance reduction to adjacent farmland. Rodenticide would be selected and used in a manner that minimizes impacts to protected biological species. Since the project would implement these measures under the Pest Management Plan and Weed Abatement Plan for the project, this standard would be met.

f. *The project shall space internal access driveways per Kings County Fire Department standards.*

Discussion. The Fire Department's "Photovoltaic Solar Panel – Additional Requirements" set forth the following standards for internal access driveways:

> "Life safety and fire suppression access roads shall be not less than 20 feet in width around the perimeter of the site and shall include interior fire access roads of not less than 20 feet in width that are spaced so that there is not greater than 400 feet in separation between fire access roads on the interior of the site" (KCFD 2019).

As shown in Figure 3 – Site Plan, the project includes perimeter roads and parallel internal access lanes with a minimum width of 20 feet at intervals of approximately 300 feet. Therefore, the project would conform to this standard.

g. *The project includes a solid waste management plan for site maintenance and disposal of trash and debris.*

Discussion. As required by Development Code Section 1112.B.2.g, solid waste management plan will be prepared for the project to prescribe internal procedures for site maintenance and collection and disposal of solid waste during project construction and operation. The non-hazardous waste generated during construction and operation would be segregated on-site for recycling or disposal at a Class III landfill. Hazardous wastes generated during project construction and operation would be either recycled or disposed of at a Class I disposal facility, as required. With the preparation and implementation of a solid waste management plan, as required, the Grape Solar Project would conform to this standard.

h. *The project site is not located on Williamson Act or Farmland Security Zone contracted land, unless it meets the principles of compatibility under Government Code section 51238.1(a). Otherwise, the contract shall be proposed for cancellation.*

Discussion. As discussed in detail above, the proposed Grape Solar Project would satisfy all of the Williamson Act principles of compatibility, as further defined by Resolution of the Kings County Board of Supervisors, for land use proposed for lands under Williamson Act contracts, including Farmland Security Zone contracts.

In summary, the project is consistent with the zoning for the Grape Solar Project site, and would be consistent with all of the Development Code provisions for the granting of Conditional Use Permits for solar generating facilities. Therefore, the Grape Solar Project would result in *no impact* with respect to conflicts with the applicable zoning as set forth in the County Development Code.

c) *Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g)?*

No Impact. Neither the Grape Solar Project site nor other lands in the vicinity are zoned forest land, timberland, or Timberland Production under the cited statutes. No portion of the Grape Solar Project site is zoned for forestland or timberland, according to the Kings County Zoning Plan (Kings County 1964). As such, the Grape Solar Project would have *no impact* with respect to conflict with existing zoning for such land, or in terms of causing the rezoning of such lands.

d) Would the project result in the loss of forest land or conversion of forest land to non-forest use?

No Impact. There is no forest land on the Grape Solar Project site or in the site vicinity. As such, the Grape Solar Project would have *no impact* in terms of loss or conversion of forest land.

e) Would the project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

Less-than-Significant Impact. As discussed under items 'a)' and 'b)' above, the Grape Solar Project would not induce conversion of other farmlands to non-agricultural uses by way of providing excess infrastructure capacities that could facilitate development on adjacent or nearby lands, or by way of introducing a land use that is incompatible with agricultural production. The project would involve no other changes that could result in the conversion of farmland to non-agricultural use.

As noted in item 'd' above, there is no forest land in the project vicinity, so the project would not involve other changes that could result in the conversion of forest land to non-forest uses.

In summary, the Grape Solar Project would involve no other changes to the existing environment which could result in the conversion of Farmland or forest land, and therefore would have a *less-than-significant impact* in this regard.

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4.3. AIR QUALITY

Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations.

Would the project:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	■	☐
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	☐	■	☐	☐
c) ***Expose sensitive receptors to substantial pollutant concentrations?***	☐	☐	■	☐
d) Result in other emissions (such as those leading to odors) affecting a substantial number of people?	☐	☐	■	☐

This section is based on the air quality assessment report prepared by Illingworth & Rodkin (I&R) in February 2021. The I&R technical air quality report is contained in Appendix A of this document. (Please refer to the I&R report for detailed discussions of climate and air basin characteristics, existing air quality conditions, health effects of air pollutants, regulatory setting, regional attainment of air quality standards, air quality plans, and detailed technical analysis of air quality impacts.)

In preparing the air quality assessment for the Grape Solar Project, Illingworth & Rodkin followed the San Joaquin Valley Air Pollution Control District (SJVAPCD) guidance for air quality analysis contained in its Guide for Assessing and Mitigating Air Quality Impact (GAMAQI)(SJVAPCD 2015).

Air Quality Setting

The primary air pollutants that would be emitted by the Grape Solar Project include ozone (O_3) precursors (NO_x and ROG), carbon monoxide (CO), and suspended particulate matter (PM_{10} and $PM_{2.5}$). Other regulated (or "criteria") pollutants, such as lead (Pb) and sulfur dioxide (SO_2), would not be substantially emitted by the proposed project or project-generated traffic, and air quality standards for them are being met throughout the San Joaquin Valley Air Basin.

Existing Air Quality

The San Joaquin Valley experiences poor air quality conditions, due primarily to elevated levels of ozone and particulate matter.

<u>Ozone (O_3)</u>

In the upper atmosphere, O_3 serves a beneficial purpose by reducing ultraviolet radiation potentially harmful to humans. However, when it reaches elevated concentrations in the lower atmosphere, it can be harmful to the human respiratory system and to sensitive species of plants.

O_3 is formed in the atmosphere by a complex series of photochemical reactions that involve "ozone precursors" that comprise two families of pollutants: oxides of nitrogen (NO_x) and reactive organic gases (ROG). NO_x and ROG are emitted from a variety of stationary and mobile sources, primarily vehicle exhaust.

Ozone concentrations in the San Joaquin Valley are typically higher than in coastal areas because of the greater frequency of hot days and stagnant conditions that are conducive to ozone formation. Ozone precursor pollutants are also carried to the valley from upwind urban areas.

Nitrogen Dioxide (NO_2)

The major health effect from exposure to high levels of NO_2 is the risk of acute and chronic respiratory disease. Nitrogen dioxide is a combustion by-product, but it can also form in the atmosphere by chemical reaction. Nitrogen dioxide is a reddish-brown colored gas often observed during the same conditions that produce high levels of O_3 and can affect regional visibility. Nitrogen dioxide is one compound in a group of compounds consisting of oxides of nitrogen (NO_x). As described above, NO_x is an O_3 precursor compound.

Particulate Matter (PM)

Regulated fractions of particulate matter include PM_{10} which consists of particulate matter that is 10 microns or less in diameter, and $PM_{2.5}$ which consists of particulates that are 2.5 microns or less in diameter. Both PM_{10} and $PM_{2.5}$ can be inhaled and cause adverse health effects. $PM_{2.5}$ (including diesel exhaust particles) is thought to have greater effects on health because minute particles are able to penetrate to the deepest parts of the lungs.

Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, fuel combustion, and atmospheric photochemical reactions. Some sources of particulate matter, such as mining and demolition and construction activities, are more local in nature, while others, such as vehicular traffic, are more regional in their effect.

Carbon Monoxide (CO)

Exposure to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause dizziness and fatigue, and causes reduced lung capacity, impaired mental abilities and central nervous system function, and induces angina in persons with serious heart disease. Primary sources of CO in ambient air are exhaust emissions from on-road vehicles, such as passenger cars and light-duty trucks, and residential wood burning.

Toxic Air Contaminants

Besides the "criteria" air pollutants, there is another group of substances found in ambient air referred to as Toxic Air Contaminants (TACs). Particulate matter from diesel exhaust is the predominant TAC in urban air and is estimated to represent about 70 percent of the cancer risk from TACs. The vast majority of diesel exhaust particles (over 90 percent) consist of $PM_{2.5}$, which are the particles that can be inhaled deep into the lung.

Air Quality Planning

At both the State and federal levels, air quality standards have been established for a range of air pollutants. These standards specify the concentrations of each criteria pollutant that the public may be exposed to without adverse health effects. Air quality monitoring data for each criteria air pollutant are used to determine if an air basin is in violation of an ambient air quality standard. Areas that do not violate federal and state ambient air quality standards are considered to have “attained” the standards. The San Joaquin Valley as a whole does not meet State or federal ambient air quality standards for ground level O_3 and the State standards for PM_{10} and $PM_{2.5}$. Accordingly, under the Federal Clean Air Act, the US EPA has classified the region as *extreme nonattainment* for the 8-hour O_3 standard and *nonattainment* for the 24-hour $PM_{2.5}$ standard. The US EPA classifies the region as *attainment* or *unclassified* for all other air pollutants, including carbon monoxide (CO). At the State level, the region is considered *severe non-attainment* for ground level O_3 and *non-attainment* for PM_{10} and $PM_{2.5}$, and is considered *attainment* or *unclassified* for all other pollutants.

In response to not meeting the air quality standards for ozone and PM, the San Joaquin Valley Air Pollution Control District (SJVAPCD) has prepared required attainment plans for each pollutant including the 2016 Ozone Plan and the 2012 $PM_{2.5}$ Plan. Both the ozone and $PM_{2.5}$ attainment plans include all measures (i.e., federal, state and local) that would be implemented through rule making or program funding to reduce air pollutant emissions.

SJVAPCD Rules and Regulations

In order to reduce emissions of ozone precursors (i.e., ROG and NO_x) and PM_{10} from new land use development projects, and achieve the attainment plans for each pollutant, the SJVAPCD adopted the Indirect Source Review Rule (ISR or Rule 9510) in 2005. The rule requires projects to reduce both construction and operational period emissions by specified amounts by applying the SJVAPCD-approved mitigation measures and/or paying fees to support off-site mitigation programs that reduce emissions. Fees apply to the unmitigated portion of the emissions and are based on estimated costs to reduce the emissions from other sources plus expected costs to cover administration of the program. Off-site emission reduction projects to be funded through ISR include retrofitting heavy-duty engines, replacing agricultural machinery and pumps, paving unpaved roads and road shoulders, trading out combustion-powered lawn and agricultural equipment with electrical and other equipment, as well as a number of other projects that result in quantifiable emissions reductions of PM_{10} and NO_X. In accordance with ISR, the project applicant will submit an application for approval of an Air Impact Assessment (AIA) to the SJVAPCD.

SJVAPCD controls PM_{10} from fugitive dust through several rules collectively known as Regulation VIII (Fugitive PM_{10} Prohibitions). The purpose of these rules is to reduce ambient concentrations of PM_{10} by requiring actions to prevent, reduce or mitigate anthropogenic (human caused) fugitive dust emissions. This applies to activities such as construction, bulk materials handling, and material transport on paved and unpaved roads, and agricultural activities. Development projects are required to provide dust control plans that meet the regulation requirements. The Air District’s required dust control measures are summarized in item ‘b’ below. Other Air District rules that apply to construction activities include Rule 4102, regarding creation of a nuisance, Rule 4601 which limits volatile organic compound emissions from architectural coatings, storage and cleanup, and Rule 4641 which limits emissions form asphalt paving materials.

Environmental Evaluation

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

Less-than-Significant Impact. The Air District's guidance document (GAMAQI) does not include methodologies for assessing the effect of a project on consistency with clean air plans developed by the SJVAPCD. Regional clean air plans developed by SJVAPCD rely on local land use designations to develop population and travel projections that are the basis of future emissions inventories. Air pollution control plans are aimed at reducing these projected future emissions. The project land uses would not alter population and vehicle related emissions projections contained in regional clean air planning efforts in any measurable way, and would not conflict with achievement of the control plans aimed at reducing these projected emissions. Therefore, the project would not conflict with or obstruct implementation of efforts outlined in the region's air pollution control plans to attain or maintain ambient air quality standards. This would be a *less-than-significant* impact.

As discussed above, in 2005 the SJVAPCD adopted the Indirect Source Review (ISR) Rule in order to fulfill the District's emission reduction commitments in its PM_{10} and Ozone attainment plans. The District has determined that implementation and compliance with the ISR would reduce the cumulative PM_{10} and NO_X impacts of growth anticipated in the air quality plans to a less-than-significant level. As discussed under item 'b' below, the project proponent will be required to file an application for ISR Review to confirm that the project will meet its emissions reduction requirements. The final emissions calculations for the project will be performed in an Air Impact Assessment (AIA), as required under ISR to determine the specific ISR reductions (i.e., in tons) that are to be achieved through on-site and/or off-site measures. Upon its implementation of ISR emission reduction measures, the project would fulfill its share of achieving the District's emission reduction commitments in the PM_{10} and Ozone attainment plans. Therefore, the Grape Solar Project would result in a *less-than-significant impact* since it would not conflict with or obstruct implementation of the applicable air quality plans.

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

Less-than-Significant Impact with Mitigation Incorporated. The SJVAPCD has developed criteria to determine if a development project could result in potentially significant regional emissions. According to Section 7.14 of the GAMAQI ("Result in a Cumulatively Considerable Net Increase of Any Criteria Pollutant?"), any proposed project that would individually have a significant air quality impact (i.e., exceed significance thresholds for ROG or NO_x) would also be considered to have a significant cumulative air quality impact. The GAMAQI further states that "a Lead Agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or mitigation program, including, but not limited to an air quality attainment or maintenance plan that provides specific requirements that will avoid or substantially lessen the cumulative problem within the geographic area in which the project is located" (SJVAPCD 2015, p. 66). For local impacts of PM_{10} from unrelated construction projects, the GAMAQI recommends a qualitative approach where construction activities from unrelated projects in the area should be examined to determine if enhanced dust suppression measures are necessary.

Project-Specific Emissions

Project-related air quality impacts fall into two categories: short-term impacts due to construction, and long-term impacts due to the project operation. During construction, the project would affect local particulate concentrations primarily due to fugitive dust sources and would contribute to ozone and PM_{10}/$PM_{2.5}$ levels from exhaust emissions. Over the long-term, the project would result in an increase in emissions of ozone precursors such as ROG and NOx, primarily due to increased motor vehicle trips (employee trips, site deliveries, and on-site maintenance activities). The construction and operational emissions associated with the Grape Solar Project are discussed below.

Construction Dust

Construction activities would generate particulate dust and other pollutants, which would temporarily affect local air quality in the surrounding area. Grading and site disturbance (e.g., vehicle travel on exposed areas) would likely result in the greatest emissions of dust and PM_{10}/$PM_{2.5}$. Windy conditions during construction could cause substantial emissions of PM_{10}/$PM_{2.5}$.

There are no residential receivers within 0.5 miles of the Grape Solar Project site. The nearest residences consist of three ranch complexes (with a total of eight dwellings) located 0.5, 1.0, and 1.5 miles east, southeast, and northeast of the project site along the east side of SR-41. The next nearest residences comprise a series of five dispersed rural residences located 2.2 to 3.9 miles northeast of the project site along 22nd Avenue. The Shannon Ranch complex, with 20 single-family dwellings, is located at the southwest corner of Avenal Cutoff Road and Lincoln/Gale Avenue approximately 2.5 miles northwest. The Stone Land Company Ranch (with 2 dwellings) is located 3.4 miles west along Nevada Avenue.

To control dust emissions, the District emphasizes implementation of effective and comprehensive control measures. Regulation VIII essentially prohibits the emissions of visible dust (limited to 20-percent opacity) and requires that disturbed areas or soils be stabilized. Prior to construction, the applicant would be required to submit a Dust Control Plan that meets the regulation requirements. As specified in District Rule 8021, these plans are subject to the review and approval by SJVAPCD before any ground disturbing activity can begin.

The provisions of Regulation VIII and its constituent rules pertaining to construction activities generally require:

- Effective dust suppression (e.g., watering) for land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill and demolition activities.
- Effective stabilization of all disturbed areas of a construction site, including storage piles, not used for seven or more days.
- Control of fugitive dust from on-site unpaved roads and off-site unpaved access roads.

- Removal of accumulations of mud or dirt at the end of the workday or once every 24 hours from public paved roads, shoulders and access ways adjacent to the site.
- Cease outdoor construction activities that disturb soils during periods with high winds.
- Record keeping for each day dust control measures are implemented.
- Limit traffic speeds on unpaved roads to 15 mph.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Landscape or replant vegetation in disturbed areas as quickly as possible.
- Prevent the tracking of dirt on public roadways. Limit access to the construction sites, so tracking of mud or dirt on to public roadways can be prevented. If necessary, use wheel washers for all exiting trucks, or wash off the tires or tracks of all trucks and equipment leaving the site.
- Suspend grading activity when winds (instantaneous gusts) exceed 25 mph or dust clouds cannot be prevented from extending beyond the site.

Anyone who prepares or implements a Dust Control Plan must attend a training course conducted by the Air District. Construction sites are subject to SJVAPCD inspections under this regulation. Compliance with Regulation VIII, including the effective implementation of a Dust Control Plan that has been reviewed and approved by the SJVAPCD, would reduce dust and PM_{10} emissions to a *less-than-significant* level.

Construction Exhaust Emissions

Equipment and vehicle trips associated with construction would emit ozone precursor air pollutants on a temporary basis. Construction equipment would also emit diesel particulate matter (DPM), which is a Toxic Air Contaminant (TAC), which can adversely affect local air quality. (See item 'c' below for a discussion of potential TAC impacts.)

Emissions of air pollutants that could affect regional air quality were addressed by modeling emissions and comparing them to the SJVAPCD significance thresholds. Construction period air pollutant emissions occurring within the air basin were modeled using the CalEEMod model. Unmitigated and mitigated emissions from all phases of construction are shown in Table 5A and 5B on the following pages.

Construction build-out scenarios were developed based on the construction schedules, and anticipated construction vehicle and equipment use. The emissions computed using CalEEMod for this assessment address use of construction equipment, worker vehicle travel, on-site vehicle and truck use, and off-site truck travel by vendors or equipment/material deliveries. Both criteria air pollutant exhaust and fugitive dust (i.e., PM_{10} and $PM_{2.5}$) were computed by CalEEMod. (Note that the unmitigated CalEEMod modeling does not include the effects of SJVUAPCD Regulation VIII that would substantially reduce fugitive PM_{10} and $PM_{2.5}$ emissions.) The air quality calculations are included as attachments to the Air Quality Assessment, which is contained in Appendix A of this document. Attachment 1 includes the construction assumptions that were used to model emissions. Attachment 2 includes the CalEEMod modeling outputs for both uncontrolled and controlled emissions.

As shown in Table 6A, on the next page, the unmitigated construction emissions from the project would exceed the applicable Air District thresholds for PM_{10} (exhaust plus fugitive) in 2022. Unless mitigated, this would represent a *significant* air quality impact. Uncontrolled emissions would not exceed the significance thresholds for other criteria pollutants.

TABLE 6A
UNCONTROLLED/UNMITIGATED CONSTRUCTION EMISSIONS IN TONS PER YEAR*

Construction Year	ROG	NO_x	CO	PM_{10}	$PM_{2.5}$
2022	1.22	8.38	9.17	**16.55**	2.06
2023	1.11	5.95	8.85	14.50	1.83
Significance Thresholds	10	10	100	15	15
Uncontrolled emissions exceed threshold?	No	No	No	**YES**	No

* Values reported for PM_{10} and $PM_{2.5}$ include fugitive dust emissions and diesel exhaust emissions combined. Fugitive dust emissions do not include the effect of measures implemented under Regulation VIII.
Source: Illingworth & Rodkin, 2021

The SJVAPCD Indirect Source Review Rule (Rule 9510) applies to construction emissions from the project. Regardless of whether a project's construction emissions of regional pollutants would exceed the Air District's CEQA significance thresholds for each pollutant or not, the project is still required to comply with Rule 9510 to ensure that the project contributes its fair share of emissions reductions in order to achieve the basin-wide reduction targets established in the Air District's Ozone and PM attainment plans. Rule 9510 requires that the project reduce construction exhaust emissions by 20 percent for NO_x and 45 percent for PM_{10} from calculated unmitigated levels. SJVAPCD encourages reductions through on-site mitigation measures. (Note: The use of the term "mitigation" under Rule 9510 does not refer to mitigation of impacts under CEQA; i.e., the ISR emission reduction percentages are required without regard to whether the CEQA emissions thresholds are exceeded or not.) Fees to purchase or sponsor off-site reductions through SJVAPCD apply when on-site mitigation measures do not achieve the required percentage of emissions reduction. Using less-polluting construction equipment, such as newer equipment or retrofitting older equipment reduces construction emissions on-site. A combination of on-site and off-site measures can be implemented to meet the overall emission reduction requirements. The unmitigated emissions reported in Table 5A do not include the reductions required by Rule 9510.

> ***Mitigation Measure AQ-1****: Apply requirements of Indirect Source Review Rule (9510) that would require emission reductions of 20 percent for NOx and 45 percent for PM_{10} (would also reduce $PM_{2.5}$). To the extent feasible, this is to be achieved by requiring that off-road diesel construction equipment greater than 25 horsepower and operating at the site for more than 20 hours meet either U.S. EPA Tier 3 or Tier 4 engine standards for emissions of nitrogen oxides and particulate matter. Any required emissions reductions that cannot be achieved by the use of Tier 3 and Tier 4 equipment shall be subject to ISR fees, as determined by the San Joaquin Air Pollution Control District, to fund off-site mitigations to achieve the remaining required emissions reductions.*

Effectiveness of Mitigation

Table 6B shows annual construction period emissions with application of District Regulation VIII and implementation of Mitigation Measure AQ-1. The effect of Mitigation Measure AQ-1 was modeled using CalEEMod, assuming all Tier 4 equipment that indicated a 29 percent decrease in NOx emissions would be achieved while all Tier 3 equipment would provide a 3 percent reduction. Therefore, this measure would provide greater than 20 percent reduction in NOx emissions, which would meet the required reduction under ISR while also reducing overall NOx emissions to below the District's significance threshold of 10 tons per year. Control measures required by SJVAPCD were selected as mitigation measures in the CalEEMod model. SJVAPCD regulations that would apply to construction activities include Regulation VIII, regarding dust control, Rule 4102, regarding creation of a nuisance, Rule 4601 which limits volatile organic compound emissions from architectural coatings, storage and cleanup, and Rule 4641 which limits emissions from asphalt paving materials.

Based on CalEEMod modeling, measures required under Regulation VIII could reduce the fugitive dust component of PM_{10} emissions by over 80 percent. Note that a substantial portion of the estimated mitigated PM_{10} emissions associated with construction would be emitted by haul trucks or vendors that travel to and from the project site. These emissions were assumed to occur entirely within the air basin. These emissions would not be directly affected by the application of Indirect Source Review Rule (9510) or *Mitigation Measure AQ-1*, which would only apply to on-site equipment (i.e., haul truck emissions are regulated by State and federal standards, and are not subject to local regulation), with any remaining required emissions reductions achieved through the payment of fees. However, the overall reduction in emissions resulting from these measures would reduce the overall construction emissions, which includes emissions from haul and delivery vehicles, to less than significant levels.

TABLE 6B

CONTROLLED/MITIGATED CONSTRUCTION EMISSIONS IN TONS PER YEAR*

Construction Year	ROG	NO_x	CO	PM_{10}	$PM_{2.5}$
2022	1.22	8.38	9.17	<9.10	<2.06
2023	1.05	4.76	8.38	<7.98	<1.83
Significance Thresholds	10	10	100	15	15
Controlled emissions exceed threshold?	No	No	No	No	No

* Includes effect of Regulation VIII and the effects of applying the Indirect Source Review Rule (9510).
Source: Illingworth & Rodkin, 2021

With implementation of the required mitigation measure, construction period emissions of ROG, NO_x, CO, and PM_{10} would be below the thresholds used by SJVAPCD to determine the significance of construction air quality impacts under CEQA. Thus, while the residual construction-related emissions of ozone precursors and particulates (i.e., emissions below the CEQA thresholds) may result in a small decrease in overall air quality, and may therefore have a small adverse health affect (as described earlier in this section under "Criteria Air Pollutants and Their Health Effects"), the overall health impact would not be significant.

It was previously noted that under Rule 9510 (ISR), the project would be responsible for reducing construction PM_{10} emissions by 45 percent, and NOx emissions by 20 percent. These reductions are required regardless of whether the project emissions exceed the CEQA significance thresholds. This CEQA analysis for unmitigated (or uncontrolled) emissions does not account for ISR reductions, as they are treated separately by the SJVAPCD. (However, it appears that the reductions in emissions that would result from implementation of *Mitigation Measure AQ-1* could meet the ISR emissions reduction requirements for both NOx and PM_{10}, assuming local availability of Tier 3 and Tier 4 equipment.) The final emissions calculations for the project will be performed in an Air Impact Assessment (AIA), as required under ISR to determine the specific ISR reductions (i.e., in tons) that will be required for the project.

Project Operation

The operation of the Grape Solar Project would result in emissions of regional air pollutants, primarily from project-generated traffic and maintenance equipment. The CalEEMod model was also used to predict annual emissions from operation of the Grape Solar Project. Since 2024 is the first full year that the Grape Solar Project could be operational, that year was used as the analysis year. Maintenance vehicle and some off-road equipment usage would occur on-site, as well as workers traveling and occasional equipment or vendor deliveries would result in some emissions. The annual emissions from project operation are shown in Table 7.

TABLE 7
ANNUAL PROJECT OPERATIONAL EMISSIONS IN TONS PER YEAR

Phase	ROG	NO_x	CO	PM_{10}[1]	$PM_{2.5}$[1]
Project Operations	0.02	0.20	0.33	0.83	0.09
Significance Threshold	10	10	100[2]	15	15
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**

[1] Includes both exhaust and fugitive dust emissions.
[2] Significant if emissions exceed 100 tons per year and then contribute to violation of the NAAQS/CAAQS.
Source: Illingworth & Rodkin, 2021

As shown in Table 7, the annual emissions from the project operation would not exceed the applicable Air District thresholds for ROG, NO_x, PM_{10}, or $PM_{2.5}$. Therefore, the air quality impact of project operation, in terms of regional pollutants, would be *less than significant* under CEQA.

Stationary combustion equipment that could emit air pollution during facility operation is not proposed for the project. Photovoltaic energy projects, such as this one, do not usually include these sources. If stationary sources are included in the project at a later date, they may require permits from SJVAPCD. Such sources could include combustion emissions from standby emergency generators (rated 50 horsepower or greater). These sources would normally result in minor emissions, compared to those from traffic generation and off-road maintenance equipment reported above. Sources of stationary air pollutant emissions complying with all applicable SJVAPCD regulations generally will not be considered to have a significant air quality impact. Stationary sources that are exempt from SJVAPCD permit requirements due to low emission rates would not be considered to have a significant air quality impact.

As discussed above under 'Construction Exhaust Emissions', the project is subject to SJVAPCD's Indirect Source Review or Rule 9510 (ISR) to reduce NO_x and PM_{10} emissions. Although the project's operational emissions of regional pollutants would not exceed the Air District's CEQA significance thresholds for each pollutant, as shown in Table 7, the project is still required to comply with Rule 9510, to ensure that the project contributes its fair share of emissions reductions in order to achieve the basin-wide reduction targets established in the Air District's Ozone and PM attainment plans. Under Rule 9510, the project would be required to reduce operational NO_x emissions by 33.3 percent and operational PM_{10} emissions by 50 percent over 10 years. Due to the nature of the project as an unstaffed facility in a rural location, it is not feasible to implement on-site reduction measures such as incentives for ridesharing or carpooling, or increasing transit access, or land use measures such as increased density near transit stops. Therefore, off-site mitigation fees will be paid by the applicant to achieve the required reductions under Rule 9510. These operational fees will be used to fund Air District air pollution reduction programs elsewhere and would fully mitigate the operational emissions under Rule 9510.

In summary, the operational emissions of ROG, NOx, PM_{10} and $PM_{2.5}$ would be below the significance thresholds applied by SJVAPCD to determine the significance of operational air quality impacts under CEQA. Thus the project's air quality impact from operational emissions would be *less than significant*.

Project Decommissioning

The Grape Solar facility would be decommissioned at the end of its productive life after 25 to 30 years of operation. The activities associated with deconstruction would be comparable to construction, but emissions are expected to be substantially lower given anticipated reductions in vehicle and equipment emissions that will be phased-in over time per State and federal regulations, and also because of the generally lower intensity of equipment use associated with decommissioning. Thus emissions during decommissioning are not expected to exceed SJVAPCD significance thresholds for any criteria pollutants. With the application of Regulation VIII dust control requirements, fugitive PM_{10} emissions are likewise expected to be below the applicable significance thresholds, as they are for construction. Therefore, the emissions associated with project decommissioning would be *less than significant*.

Cumulative Emissions

Regional Air Pollutant Emissions

As discussed, cumulative ozone impacts would be considered significant if the project-specific emissions exceed the SJVAPCD significance thresholds for ozone precursors ROG or NO_X, or the project is not consistent with the regional clean air plan. As discussed in item 'b' (and shown in Table 6b) above, project-specific construction emissions of ozone precursor pollutants (ROG and NO_x) and PM were found to be less-than-significant after mitigation. As discussed in item 'a' above, the project would fulfill its share of achieving the Air District's emission reduction commitments in the PM_{10} and Ozone attainment plans through its obligation to implement ISR emission reduction measures under Air District Rule 9510. Therefore, the project would fully comply with the applicable air quality plans and would not conflict with or obstruct their implementation. Therefore, the project contribution to cumulative regional air quality impacts would be *less than significant*.

Local Air Pollutant Emissions

Construction period PM_{10} emissions would be localized. With implementation of SJVAPCD Regulation VIII, construction period impacts would be less than significant. Additional construction that may occur in the area concurrently with the project would be subject to SJVAPCD Regulation VIII, as well as the District's Indirect Source Review Rule 9510, which would reduce cumulative construction emissions to less-than-significant levels. In summary, the cumulative project impacts to localized air quality impacts from criteria pollutants for which the region is in non-attainment would be *less-than-significant*.

c) Would the project expose sensitive receptors to substantial pollutant concentrations?

Less-than-Significant Impact. Land uses that are considered sensitive to localized increases in emissions of air pollutants include hospitals, care facilities, schools, parks, and residential areas. The nearest sensitive receptors to the Grape Solar Project site include: 1) Three ranch complexes (with a total of eight dwellings) located 0.5 miles east, 1.0 mile southeast, and 1.5 miles northeast of the project site along the east side of SR-41; 2) Five dispersed agricultural residences located 2.2 to 3.9 miles northeast of the project site along 22^{nd} Avenue; 3) The Shannon Ranch complex (including 20 dwellings) located 2.5 miles northwest; and 4) The Stone Land Company Ranch (with 2 dwellings) located 3.4 miles west along Nevada Avenue.

The two main types of pollutants that can occur in high localized concentrations are carbon monoxide from vehicular emissions and Toxic Air Contaminants (TACs) from diesel exhaust. Other pollutants, such as lead (Pb) and sulfur dioxide (SO_2) would not be substantially emitted by the project, and air quality standards for them are being met throughout the San Joaquin Valley Air Basin. The potential for the project to result in substantial concentrations of CO or TACs is discussed below.

Carbon Monoxide

Project traffic would slightly increase concentrations of carbon monoxide along roadways providing access to the project. Since the major source of carbon monoxide (CO) is automobile traffic, elevated concentrations of CO occur near areas of high traffic volume and congestion. Emissions and ambient concentrations of CO have decreased greatly in recent years. These improvements are due largely to the introduction of cleaner burning motor vehicles and reformulated motor vehicle fuels. No exceedances of the State or federal CO standards have been recorded at any of San Joaquin Valley's monitoring stations in the past 15 years. The San Joaquin Valley Air Basin has attained the State and National CO standards.

In order to determine where a project has the potential to result in a violation of a CO standard, the SJVAPCD applies the following screening criteria: 1) the level of service (LOS) on one or more streets or intersections would be reduced to LOS E of F by the project; and 2) the project would substantially worsen the LOS at a street or intersection in the vicinity operating at LOS F under pre-project conditions. As discussed in section *4.17. Transportation*, all roadway segments that would be affected by project traffic would operate at LOS C or better during the peak of construction activity when the greatest traffic volumes would be generated by the project. Since neither of the SJVAPCD screening criteria would thus be met, the Grape Solar Project would not result in a violation of the CO standard and therefore would result in a *less-than-significant impact* in terms of exposing sensitive receptors to substantial concentrations of carbon monoxide.

Toxic Air Contaminants

The Toxic Air Contaminant (TAC) that is relevant to the Grape Solar Project is Diesel Particulate Matter (DPM), which would be emitted by diesel-fueled equipment and vehicles during construction, and by diesel-fueled vehicles used during project operations including worker vehicles, delivery trucks, and maintenance vehicles.

The highest daily levels of DPM would be emitted during construction activities from use of heavy-duty diesel equipment such as bulldozers, excavators, loaders, graders and diesel-fueled haul trucks. However, these emissions would be intermittent, and would vary throughout the project site area, and would be of a temporary duration (approximately 14-months of total construction activity). During project operations, low-level DPM emissions would result from worker vehicles and maintenance activities, but they would be constant over the lifetime of the project. Operational DPM emissions would mainly result from the use of pickup trucks with a portable water trailer (and pump) which would be used for panel cleaning.

Levels of DPM emissions can be generally inferred from PM_{10} emissions, of which diesel exhaust constitutes a substantial component. Table 6b, above, shows that PM_{10} emissions from solar project construction would be well below the applicable significance threshold with implementation of required mitigation. Table 7 above, shows that PM_{10} emissions from operational activities would also be well below the significance threshold.

Because of the relatively small levels of DPM emissions during project construction and operation, and due to the substantial distances to the nearest sensitive receptors (e.g., the nearest residence is at least 0.5 miles from the nearest project boundary), DPM emissions from project construction would disperse to negligible levels at the nearest receptor locations, and thus the health impacts associated with exposure to DPM from project construction and operation are not anticipated to be significant. Therefore, the Grape Solar Project would result in a *less-than-significant impact* in terms of exposing sensitive receptors to substantial concentrations of Toxic Air Contaminants.

Cumulative Toxic Air Pollutant Impacts

With respect to cumulative emissions of Toxic Air Contaminants (TACs), it is important to note that Diesel Particulate Matter (DPM) concentrations diminish rapidly from the source. Pollutant dispersion studies by the California Air Resources Board (CARB) have shown that there is about a 70 percent drop-off in DPM concentrations at approximately 500 feet from the source (BAAQMD 2017, p. 8-7). This is reflected in the screening tables prepared by the Bay Area Air Quality Management District (BAAQMD) to determine setback distances where TAC exposures would be reduced to less than significant levels. For the largest construction projects, the recommended setback distance is up to 1,000 feet from the sensitive receptor location (BAAQMD 2010, p. 9). Thus multiple sources of DPM emissions must all be proximate to a receptor to have a significant additive effect to DPM concentrations at the receptor site. Since the nearest sensitive receptors to the Grape Solar Project are approximately 3,000 feet from the nearest site boundary, most DPM emissions from the project would disperse into the atmosphere before reaching the nearest sensitive receptor locations.

The SJVAPCD's TAC significance criterion for an individual project is an increase in cancer risk of more than 20 in a million persons as measured over a 70-year lifetime for the maximally exposed individual (SJVAPCD 2015b). For context, it is noted that the lifetime cancer risk from all sources is approximately 250,000 cases per million (or 1 case per 4 individuals)(SJVAPCD 2015c, p. 100). The 20 per million significance criterion is applied to individual projects where there is a potential for a significant health impact to nearby sensitive receptors. This same significance threshold is applied by SJVACPD for cumulative TAC impacts, although the Air District considers it to be stringent (SJVAPCD 2015c, p. 110). The CEQA Guidelines of the BAAQMD states that a project would have cumulative significant impact if there is an increased cancer risk of more than 100 cases per million persons. Under the BAAQMD guidelines, the cumulative analysis is to consider all TAC sources that are located within 1,000 feet of the proposed project, or from the location of a receptor (BAAQMD 2017, p. 5-16). [Note: The analysis of increased cancer risk includes the consideration of completed projects since TAC analyses consider the lifetime exposure of the receptors without regard to construction schedules of the projects.]

The nearest residential receptors to the Grape Solar Project site comprise the three dwellings at the nearest ranch complex located just east of SR-41 on Nevada Avenue, the nearest of which is located approximately 3,000 feet from the east project boundary. Based on TAC analyses performed on another large solar project in the vicinity (i.e., American Kings), it is estimated that approximately 1.0 new cancer cases per million would result from project TAC emissions at a receptor located 3,000 feet away, and that cancer risk at receptors would be lower than 1.0 per million at distances beyond 3,000 feet, with the risk decreasing with distance from the source (Kings County 2018, p. 3-66, p. 3-94). This is well below the SJVACPD significance threshold of 20 cases per million. The nearest approved and pending solar projects which could potentially contribute TAC emissions at this receptor location are the Chestnut Solar Project, located 1.0 mile north of these ranch dwellings, the Cherry Solar Project, located 1.2 miles west of the dwellings, and the Solar Blue project located 2.0 miles north of these dwellings. (Although the Chestnut, Cherry, and Solar Blue projects are located within the Westlands Solar Park and would not be constructed concurrently with each other or the Grape Solar Project, they are included in this analysis since TAC analyses consider the lifetime exposure of the receptors without regard to construction schedule.) At these distances, the increased cancer risk from each of these three nearby projects would be less than 1.0 cancer case per million, under the reasonable assumption that meteorological conditions at these project sites would be very similar those at the reference project located several miles to the north. Assuming for the sake of simplicity that that cancer risks associated with individual projects can be aggregated in absolute terms, the combined lifetime exposure from TAC emissions at the three ranch dwellings from all four projects (including Grape Solar) would be less than 4.0 cancer cases per million, which is far less than the significance threshold of 20 cases per million. Thus it is not expected the cumulative TAC emissions from all of the known and foreseeable projects in the vicinity would result in a significant increase in cancer risk at the nearest sensitive receptor subject to cumulative emissions from these nearby projects and the Grape Solar Project. Therefore, the cumulative health risk impact associated with the Grape Solar Project would be *less than significant*, and the project contribution to the cumulative health risk impact would *not be considerable*.

d) Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Less-than-Significant Impact. During construction, the various diesel powered vehicles and equipment in use on the Grape Solar Project site would create localized odors. These odors would be temporary and would dissipate relatively quickly and thus would not likely be noticeable for extended periods of time beyond the project boundaries. Most if not all diesel odors carried off-site would disperse into the atmosphere before reaching the nearest sensitive receptors located at least 0.5 miles away. There are no other emissions sources associated with the Grape Solar Project. Other than emissions discussed under previous items in this section, the Grape Solar Project would not result in other emissions, including emissions leading to odors, adversely affecting a substantial number of people; therefore, the impact would be *less than significant*.

REFERENCES – AIR QUALITY

BAAQMD 2010 — Bay Area Air Quality Management District (BAAQMD). 2010. *Screening Tables for Air Toxics Evaluation During Construction*. May. http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/CEQA_Construction_Screening_Approach.ashx

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CARB 2005 — California Air Resources Board (CARB). 2005. *Air Quality and Land Use Handbook: A Community Health Perspective*. April. http://www.arb.ca.gov/ch/handbook.pdf

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SJVAPCD 2015c — San Joaquin Valley Air Pollution Control District (SJVAPCD). 2015. *Guidance for Assessing and Mitigating Air Quality Impacts (GAMAQI)*. March. http://www.valleyair.org/transportation/GAMAQI_12-26-19.pdf

4.4. BIOLOGICAL RESOURCES

Would the project:		Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant	No Impact
a)	***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 the California Department of Fish and Game or U.S. Fish and Wildlife Service?***	☐	■	☐	☐
b)	***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 California Department of Fish and Game or U.S. Fish and Wildlife Service?***	☐	☐	☐	■
c)	***Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?***	☐	☐	☐	■
d)	***Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?***	☐	☐	■	☐
e)	***Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?***	☐	☐	☐	■
f)	***Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?***	☐	☐	☐	■

This section summarizes the analysis and conclusions of the biological assessment report prepared by Live Oak Associates (LOA) in December 2020. The LOA report is contained in Appendix B of this document.

Biological Setting

Biotic Habitats/Land Uses

The entire 1,759-acre Grape Solar project site consists of agricultural fields which are currently cultivated for winter wheat during the wet season and is typically left fallow during the dry season. The 70-kV Henrietta to Tulare Lake sub-transmission line runs in a north-south direction through the center of the site along the 25th Avenue alignment. There are no buildings, sheds, wells, or other structures on the Grape Solar Project site.

Regular agricultural activities on the site create unsuitable habitat for most native amphibian, reptile, bird, and mammal species. Nonetheless, a number of animal species are expected to use the disked fields, especially in times where disking is not recent. The majority of the site supports winter wheat or fallowed fields. The moderately-sized canal along the 25th Avenue alignment, and large canals nearby to the east (Empire Westside Main Canal) and west, as well as a large off-site canal 2 miles north along the south side of Laurel Avenue, provide the best habitat for burrowing owls in the local vicinity. Onsite canals are fairly small with the exception of the canal adjacent to the unimproved 25th Avenue alignment, which runs through the central portion of the site. These canals support water and hydric species such as cattail, cottonwood, willow, and tamarisk.

Pacific chorus frogs and western toads may use the irrigation canals for breeding and may also disperse through the adjacent fields during the winter and spring or when the fields are not regularly disked. Reptile species that may forage in this habitat include lizards such as the side-blotched lizard and western whiptail, and snakes such as the gopher snake, common kingsnake, coachwhip, and glossy snake.

Resident bird species expected to use this habitat would include Brewer's blackbirds, brown-headed cowbirds, and European starlings, among others. Wintering birds that may utilize the disked fallow fields would be the savannah sparrow, American pipit, and Say's phoebe, among others. Summer migrants such as the barn swallow may forage on the site.

Burrowing rodent activity in the fields is expected to be minimal due to the ground disturbance regime. Botta's pocket gopher burrows occur within the site, and California ground squirrel burrows occur along the agricultural field perimeters.

The site offers limited foraging opportunities for mammalian and avian predators. Raptors such as red-tailed hawks, Swainson's hawks, great horned owls, burrowing owls, and barn owls may forage on the site, and burrowing owls are known to breed in the local vicinity, including the canal south of Laurel Avenue located 2 miles to the north. Disturbance-tolerant mammalian predators such as raccoons, striped skunks, coyotes, and red foxes may occasionally forage on or pass through the site.

Special Status Plants and Animals

Several species of plants and animals within the state of California have low populations and/or limited distributions. Such species may be considered "rare" and are vulnerable to extirpation as the state's human population grows and the habitats these species occupy are converted to agricultural and urban uses. State and federal laws have provided the California Department of Fish and Wildlife (CDFW) and the U.S. Fish and Wildlife Service (USFWS) with a mechanism for conserving and protecting the diversity of plant and animal species native to the state. (See LOA's biological report in Appendix B for a full description of applicable laws and regulations.) A sizable number of native plants and animals have been formally designated as "threatened" or "endangered" under state and federal endangered species legislation. Others have been designated as candidates for such listing. Still others have been designated as "species of special concern" by the CDFW. The California Native Plant Society (CNPS) has developed its own set of lists of native plants considered rare, threatened, or endangered. Collectively, these plants and animals are referred to as "special status species."

A number of special-status species occur in the project vicinity. The LOA biological report lists a total of 3 plant species and 38 animal species with potential to occur in the project area. All three of the listed plant species (California jewel-flower, Kern mallow, and San Joaquin woollythreads) are considered to be absent from the project site. Twenty-four animal species are either absent or are considered unlikely to occur on the Grape Solar site. These include: vernal pool fairy shrimp, valley elderberry longhorn beetle, California tiger salamander, western spadefoot, western pond turtle, Temblor legless lizard, coast horned lizard, blunt-nosed leopard lizard, giant garter snake, California glossy snake, San Joaquin whipsnake, American white pelican (nesting), black swift, Vaux's swift, western yellow-billed cuckoo, Nelson's antelope squirrel, giant kangaroo rat, Fresno kangaroo rat, Tipton kangaroo rat, short-nosed kangaroo rat, Tulare grasshopper mouse, American badger, San Joaquin kit fox, and ringtail.

An additional 14 animal species may regularly or occasionally utilize the Grape Solar site for foraging, including the western snowy plover, mountain plover, white-faced ibis, Swainson's hawk, northern harrier, white-tailed kite, western burrowing owl, long-eared owl, loggerhead shrike, tricolored blackbird, yellow-headed blackbird, Townsend's big-eared bat, pallid bat, and California mastiff bat. The project site does not provide regionally important foraging habitat for these species. Migrant species such as the mountain plover pass through or over many types of habitats en route to breeding or wintering habitat. White-faced ibis may possibly forage in agricultural fields of the project vicinity from time to time.

The three bat species listed above, including the Townsend's big-eared bat, pallid bat, and California mastiff bat may forage over the site; however, roosting habitat is absent from the Grape Solar site for these species.

TABLE 8
SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE PROJECT VICINITY

PLANTS *Species Listed as Threatened or Endangered under the State and/or Federal Endangered Species Acts*			
Common and scientific names	**Status**	**General habitat description**	***Occurrence in the Project Site**
California jewelflower (*Caulanthus californicus*)	FE, CE, CRPR 1B.1	Habitat: Chenopod scrub, valley and foothill grassland, pinyon-juniper woodland. Elevation: 61-1000 meters. Blooms: February–May.	**Absent.** Suitable habitat for this species is absent from the Grape Solar site and access corridor. Any suitable habitat that may have once been present has been highly modified for human use.
Kern mallow (*Eremalche parryi* ssp. *kernensis*)	FE, CRPR 1B.2	Habitat On dry, open sandy to clay soils; often at edge of balds in Chenopod scrub, Pinyon and juniper woodland, Valley and foothill grassland. Elevation: 70 – 1290 meters. Blooms: January - May.	**Absent**. Suitable habitat for this species is absent from the Grape Solar site and access corridor. Any suitable habitat that may have once been present has been highly modified for human use.
San Joaquin woolythreads *(Monolopia congdonii)*	FE CRPR 1B.2	Habitat: Chenopod scrub, valley and foothill grassland. Elevation: 60-800 meters. Blooms: February-May.	**Absent**. Suitable habitat for this species is absent from the Grape Solar site and access corridor. Any suitable habitat that may have once been present has been highly modified for human use.

TABLE 8 (CONT'D)
SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE PROJECT VICINITY

ANIMALS
Species Listed as Threatened or Endangered under the State and/or Federal Endangered Species Acts

Common and scientific names	Status	General habitat description	* Occurrence in the Project Site
Vernal pool fairy shrimp (*Branchinecta lynchi*)	FT	Occurs in vernal pools of California.	**Absent.** Suitable habitat in the form of vernal pools is absent from the Grape Solar site.
Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)	FT	Lives in mature elderberry shrubs of California's Central Valley and Sierra Foothills.	**Absent.** Suitable habitat in the form of elderberry shrubs is absent from the Grape Solar site.
California tiger salamander *(Ambystoma californiense)*	FT, CT	Breeds in vernal pools and stock ponds of central California; adults aestivate in grassland habitats adjacent to the breeding sites.	**Absent**. No historic or current records of this species are known within the region. Intensively cultivated lands provide unsuitable habitat for this species.
Giant garter snake *(Thamnophis gigas)*	FT, CT	Habitat requirements consist of (1) adequate water during the snake's active season (early-spring through mid-fall) to provide food and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat during the active season; (3) grassy banks and openings in waterside vegetation for basking; and (4) higher elevation uplands for cover and refuge from flood waters during the snake's dormant season in the winter.	**Unlikely**. Marginal breeding and overwintering habitat is available along the irrigation canals at the Grape Solar site. However, the nearest recorded observation is more than 3 miles from the site (CNDDB 2020).
Blunt-nosed leopard lizard (*Gambelia sila*)	FE, CE, CP	Frequents grasslands, alkali meadows and chenopod scrub of the San Joaquin Valley from Merced south to Kern County.	**Absent.** Habitats required by this species are absent from the Grape Solar site and vicinity.
Swainson's hawk *(Buteo swainsoni)*	CT	Breeds in stands with few trees in juniper-sage flats, riparian areas, and in oak savannah. Requires adjacent suitable foraging areas such as grasslands or alfalfa fields supporting rodent populations.	**Present.** Foraging habitat is available throughout the project area. Potential breeding habitat is present at the off-site tailwater pond which is nearly adjacent to the northwestern corner of the site, which is within the typical construction-free buffer required around an active nest. Swainson's hawks were observed flying over the Grape Solar site during the 2018 and 2019 spring site visits for other adjacent solar projects; they are known to occur over and near the site, per previous surveys conducted by LOA as well. See detailed discussion of Swainson's hawk in the main text of this section.

TABLE 8 (CONT'D)
SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE PROJECT VICINITY

ANIMALS *Species Listed as Threatened or Endangered under the State and/or Federal Endangered Species Acts*			
Common and scientific names	**Status**	**General habitat description**	*** Occurrence in the Project Site**
Western yellow-billed cuckoo (Coccyzus americanus occidentalis)	FC, CE	Breed in large blocks of riparian habitats, particularly cottonwoods and willows.	**Absent**. Dense riparian habitat required by this species is absent from the Grape Solar site.
Western snowy plover (*Charadrius alexandrines nivosus*)	FT, CSC	Uses man-made agricultural wastewater ponds and reservoir margins. Breeds on barren to sparsely vegetated ground at alkaline or saline lakes, reservoirs, ponds, and riverine sand bar.	**Possible.** Breeding and foraging habitat is available along agricultural canals within the Grape Solar site and the canals adjacent to the site to the east and west.
Tricolored Blackbird (*Agelaius tricolor*)	CSC	Breeds near fresh water, primarily emergent wetlands, with tall thickets. Forages in grassland and cropland habitats.	**Possible.** Foraging habitat for this species is present within the Grape Solar site in the form of cattails in the canals of the site, specifically the canal adjacent to 25^{th} Avenue and within off-site canals to the east and west of the site, as well as the canal located 2 miles to the north along Laurel Avenue; however, presence of breeding habitat on the site itself would depend on the type of crop planted from season to season. The Grape Solar site has typically been cultivated for winter wheat in the wet season and left fallow during the dry season. Tricolored blackbirds are known to nest in wheat fields.
Nelson's antelope squirrel *(Ammospermophilus nelsoni)*	CT	Frequents open shrublands and annual grassland habitats.	**Absent**. Habitats required by this species are absent from the Grape Solar site and surrounding agricultural lands due to intensive agricultural use.
Giant kangaroo rat *(Dipodomys ingens)*	FE, CE	Inhabits grasslands on gentle slopes generally less than 10°, with friable, sandy-loam soils.	**Absent**. Habitats required by this species are absent from the Grape Solar site and surrounding agricultural lands due to intensive agricultural use.
Fresno kangaroo rat (Dipodomys nitratoides exilis)	FE, CE	Inhabits grassland on gentle slopes generally less than 10°, with friable, sandy-loam soils.	**Absent**. Habitats required by this species are absent from the Grape Solar site and surrounding agricultural lands due to intensive agricultural use.
Tipton kangaroo rat (Dipodomys nitratoides nitratoides)	FE, CE	Inhabits arid land with grassland or salt scrub on level or near-level terrain on the San Joaquin Valley floor with alluvial fan and floodplain soils.	**Absent**. Habitats required by this species are absent from the Grape Solar site and vicinity.

TABLE 8 (CONT'D)
SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE PROJECT VICINITY

ANIMALS ***Species Listed as Threatened or Endangered under the State and/or Federal Endangered Species Acts***			
Common and scientific names	**Status**	**General habitat description**	*** Occurrence in the Project Site**
San Joaquin kit fox (*Vulpes macrotis mutica*)	FE, CT	Frequents desert alkali scrub and annual grasslands and may forage in adjacent agricultural habitats. Utilizes enlarged (4 to 10 inches in diameter) ground squirrel burrows as denning habitat.	**Unlikely.** Some burrows observed in the surrounding area were of suitable size for the kit fox. However, nearly all these burrows were within the vicinity of California ground squirrels or actively used by ground squirrels. The Grape Solar site and the surrounding area have been highly modified for agricultural use and, as a result, provide only marginal foraging and breeding habitat for the kit fox. There are no documented sightings of this species on the Grape Solar site or in the surrounding area, but there have been numerous documented sightings within a ten-mile radius of the Grape Solar site between 1975 and 2000 (CNDDB 2020). Therefore, kit foxes are unlikely to breed within the Grape Solar site but may occasionally forage within the site, and may use the site for dispersal movements.
ANIMALS ***State Species of Special Concern (adapted from CDFW 2016 and USFWS 2016)***			
Common and scientific names	**Status**	**General habitat description**	*** Occurrence in the Project Site**
Western spadefoot (*Spea hammondii*) (*Scaphiopus hammondii*)	CSC	Primarily occurs in grasslands, but also occurs in valley and foothill hardwood woodlands. Requires vernal pools or other temporary wetlands for breeding.	**Absent.** Vernal pools required for breeding are absent from the Grape Solar site. Terrestrial habitat required for estivation is absent from cultivated field.
Western pond turtle *(Actinemys marmorata)*	CSC	Intermittent and permanent waterways including streams, marshes, rivers, ponds and lakes.	**Unlikely.** While marginal habitat, in the form of the canals, exists within the Grape Solar site, estivation and breeding habitat is absent from the site.

TABLE 8 (CONT'D)
SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE PROJECT VICINITY

ANIMALS ***State Species of Special Concern (adapted from CDFW 2016 and USFWS 2016)***			
Common and scientific names	**Status**	**General habitat description**	*** Occurrence in the Project Site**
Temblor legless lizard *(Anniella alexanderae)*	CSC	The Temblor legless lizard (previously called silvery legless lizard) occurs mostly underground in warm moist areas with loose soil and substrate and is known only from two sites west of Highway 33 at the base of the Temblor Range between McKittrick and Taft in Kern County.	**Absent**. The Project site is outside this species' range.
Coast horned lizard (*Phrynosoma blainvillii*)	CSC	Grasslands, scrublands, oak woodlands, etc. of central California. Common in sandy washes with scattered shrubs.	**Absent.** Habitats required by this species are absent because they have been heavily modified for human use. The nearest documented observation of this species is more than 27 miles to the northwest of the Grape Solar site (CNDDB 2020).
California glossy snake (*Arizona elegans occidentallis*)	CSC	Occurs in arid areas with grassland, scrub, chaparral, and rocky washes. This species is nocturnal and spends the day in burrows.	**Absent.** Habitats required by this species are absent from the Project Site and vicinity.
San Joaquin whipsnake (*Masticophis flagellum ruddocki*)	CSC	Open, dry habitats with little or no tree cover. Found in valley grasslands and saltbush scrub in the San Joaquin Valley.	**Absent.** Habitats required by this species are absent from the Grape Solar site and vicinity.
American white pelican (nesting) *(Pelecanus erythrorhynchos)*	CSC	Nests on islands in large lakes or on ephemeral islands in shallower wetlands.	**Unlikely**. Nesting habitat is absent from the Grape Solar site. This species has observed flying over the general area in previous years; however, the species is unlikely to stop and nest within the Grape Solar site.
White-faced ibis *(Plegadis chihi)*	CSC	Salt and freshwater marsh as well as grain and alfalfa fields.	**Possible**. Marginal foraging habitat required for this species is present in the form of the agricultural fields within the Grape Solar. Breeding habitat is absent.
Northern harrier *(Circus cyaneus)*	CSC	Frequents meadows, grasslands, open rangelands, freshwater emergent wetlands; uncommon in wooded habitats.	**Possible.** Harriers were observed foraging over agricultural fields within the general area during previous surveys, and foraging habitat exists on the Grape Solar site. However, breeding habitat is absent.

TABLE 8 (CONT'D)
SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE PROJECT VICINITY

ANIMALS ***State Species of Special Concern (adapted from CDFW 2016 and USFWS 2016)***			
Common and scientific names	**Status**	**General habitat description**	*** Occurrence in the Project Site**
White-tailed kite (*Elanus leucurus*)	CP	Open grasslands and agricultural areas throughout central California.	**Possible.** Suitable foraging habitat occurs for this species within the Grape Solar site; however, breeding habitat is absent.
Mountain plover (*Charadrius montanus*)	CSC	Forages in short grasslands and freshly plowed fields of the Central Valley.	**Possible.** The Grape Solar site provides potential winter foraging habitat for this species; however, the species does not breed in this region.
Burrowing owl (*Athene cunicularia*)	CSC	Frequents open, dry annual or perennial grasslands, deserts, and scrublands characterized by low growing vegetation. Dependent upon burrowing mammals, most notably the California ground squirrel, for nest burrows.	**Present.** Burrowing owls were not observed onsite during the 2020 site visit. However, site visits for adjacent solar projects in April and May of 2018 and April of 2019 identified burrowing owls in the canal south of Laurel Avenue located 2 miles north of the site as well as in a north-south canal located approximately 1.5 miles north of the northwestern corner of the site. Currently, suitable breeding habitat onsite consists of burrows within canal banks and foraging habitat exists within the winter wheat fields.
Long-eared owl (nesting) *(Asio otus)*	CSC	Occurs on edge habitats including in clumps of trees or edges of open forests that are adjacent to grasslands, shrublands, wetlands, marshes, and farmlands. Need stick nests built by other birds in trees.	**Possible.** Although the Grape Solar site does not support suitable nesting habitat for this species except for the potential for nesting to occur on utility poles, small clumps of suitable trees do exist in the vicinity of the site at the off-site tailwater pond which is nearly adjacent to the northeastern portion of the project site. Therefore, long-eared owls may use the project site as foraging area.
Black swift *(Cypseloides niger)*	CSC	Migrants found in many habitats of state; in Sierra nests are often associated with waterfalls.	**Absent.** The Grape Solar site does not provide suitable breeding or foraging habitat for this species.
Vaux's swift *(Chaetura vauxi)*	CSC	Migrants move through the foothills of the western Sierra in spring and late summer. Some individuals breed in the region.	**Absent.** The Grape Solar site does not provide suitable breeding or foraging habitat for this species.

TABLE 8 (CONT'D)
SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE PROJECT VICINITY

ANIMALS ***State Species of Special Concern (adapted from CDFW 2016 and USFWS 2016)***			
Common and scientific names	**Status**	**General habitat description**	*** Occurrence in the Project Site**
Loggerhead Shrike (*Lanius ludovicianus*)	CSC	Frequents open habitats with sparse shrubs and trees, other suitable perches, bare ground, and low herbaceous cover. Can often be found in cropland.	**Present.** This species was observed adjacent to the Grape Solar site during the January 2020 site visit. The project site may support marginal nesting habitat within vegetated canals of the site, specifically the canal along 25th Avenue.
Yellow-headed blackbird (*Xanthocephalus xanthocephalus*)	CSC	Occurs in freshwater marshes with cattails, tule, and bulrush during the summer and open, cultivated fields and pastures in the winter.	**Possible.** The larger canals of the site support potential breeding and foraging habitat for this species and the smaller canals of the site support foraging habitat for this species.
Tulare grasshopper mouse (*Onychomys torridus tularensis*)	CSC	Arid shrubland communities in hot, arid grassland and scrub desert associations. These include blue oak woodlands at 450 m (1476 feet); upper sonoran subshrub scrub community; alkali sink and mesquite associations on the valley floor; and grasslands associations on the sloping margins of the San Joaquin Valley and Carrizo Plain region.	**Absent.** Suitable shrubland habitat is not present within the Grape Solar site.
Short-nosed kangaroo rat (*Dipodomys nitratoids brevinasus*)	CSC	Occur in lighter, powdery soils such as the sandy bottoms and banks of arroyos and other sandy areas with slightly to highly saline soils on gently sloping and rolling low hill-tops with shrubs.	**Absent**. Habitats required by short-nosed kangaroo rats are absent from the study area and surrounding agricultural lands due to intensive agricultural use.
Townsend's Big-eared bat *(Corynorhinus townsendii)*	CSC	Primarily a cave-dwelling bat that may also roost in buildings. Occurs in a variety of habitats.	**Possible.** Suitable foraging habitat is present within the Grape Solar site; however, roosting habitat is absent.
Pallid bat *(Antrozous pallidus)*	CSC	Roosts in rocky outcrops, cliffs, and crevices with access to open habitats for foraging. May also roost in caves, mines, hollow trees and buildings.	**Possible.** Although suitable habitat for the pallid bat is absent from the Grape Solar site, the entire site supports suitable foraging habitat for this species.

TABLE 8 (CONT'D)
SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE PROJECT VICINITY

ANIMALS *State Species of Special Concern (adapted from CDFW 2016 and USFWS 2016)*			
Common and scientific names	**Status**	**General habitat description**	*** Occurrence in the Project Site**
California mastiff bat (*Eumops perotis* ssp. *californicus*)	CSC	Frequents open, semi-arid to arid habitats, including conifer, and deciduous woodlands, coastal scrub, grasslands, palm oasis, chaparral and urban. Roosts in cliff faces, high buildings, trees and tunnels.	**Possible.** Although suitable habitat for the California mastiff bat is absent from the Grape Solar site The entire site supports suitable foraging habitat for this species.
American badger (*Taxidea taxus*)	CSC	Found in drier open stages of most shrub, forest and herbaceous habitats with friable soils.	**Unlikely.** No burrows of the size and shape suitable for this species were observed on the Grape Solar site. It is possible this species may establish burrows within the Grape Solar site; however, it is unlikely that badgers would breed on the site or within the vicinity.
Ringtail *(Bassariscus astutus)*	CP	Riparian and heavily wooded habitats near water.	**Absent.** Habitat for this species is absent from the Grape Solar site.

***Explanation of Occurrence Designations and Status Codes**
Present: Species observed within the project site at time of field surveys or during recent past.
Likely: Species not observed within the project site, but it may reasonably be expected to occur there on a regular basis.
Possible: Species not observed within the project site, but it could occur there from time to time.
Unlikely: Species not observed within the project site, and would not be expected to occur there except, perhaps, as a transient.
Absent: Species not observed within the project site, and precluded from occurring there because habitat requirements not met.

TABLE 8 STATUS CODES

FE	Federally Endangered	CE	California Endangered
FT	Federally Threatened	CT	California Threatened
FPE	Federally Endangered (Proposed)	CR	California Rare
FC	Federal Candidate	CP	California Fully Protected
		CSC	California Species of Special Concern

CNPS	California Native Plant Society Listing
1A	Plants Presumed Extinct in California
1B	Plants Rare, Threatened, or Endangered in California and elsewhere
5	Plants Rare, Threatened, or Endangered in California, but more common elsewhere
6	Plants about which we need more information – a review list
7	Plants of limited distribution – a watch list

Source: Live Oak Associates, 2020

A detailed discussion of the species with potential to use the project site as breeding habitat (burrowing owl), and as a transit corridor (San Joaquin kit fox) follows. This discussion also includes Swainson's hawk, a potential forager on the site, due to its status as a listed Threatened Species in California.

<u>Burrowing Owl</u>

The burrowing owl is designated as a California Species of Special Concern, and has no federal listing status. This designation was based on the species' declining population within the state over the past 40 years. The population decline is mainly due to habitat destruction resulting from development and agricultural practices.

Burrowing owls are unique in that they are the only owl that regularly lives and breeds in underground nests. In California, these birds typically occur in the Central and Imperial Valleys, primarily utilizing ground squirrel burrows (or the burrows of other animals, e.g., badgers, prairie dogs and kangaroo rats) found in grasslands, open shrub lands, deserts, and, to a lesser extent, grazed and agricultural lands.

The site was evaluated on January 22, 2020 for the potential for the site to support burrowing owls. Although no burrowing owls were observed, potential suitable habitat exits within the project site in the form of ground squirrel burrows and pipes. Adjacent lands were surveyed on April 10 and May 28, 2018 and April 11, 2019. During 2018 surveys, three pair of burrowing owls and one single burrowing owl were observed along the canal on the south side of Laurel Avenue (2 miles north of the project site) with one burrowing owl observed approximately 1.5 miles to the north of the northwest corner of the Project Site. On April 11, 2019, no burrowing owls were observed on or near the Grape Solar Project site. Previous surveys in 2011 and 2012 identified the closest known occurrence of burrowing owls to the site, which were within a half mile and within a mile to the south of the site in a canal.

Currently, suitable habitat onsite consists mainly of man-made 'burrows', such as pipes, as well as ground squirrel burrows within and along the on-site canals. The Grape Solar site provides suitable nesting/denning habitat for burrowing owls in the form of California ground squirrel burrows along the edges of the agricultural fields and in and along the canals, and in the form of pipes in or on the ground, as well as foraging habitat within the agricultural fields. Canal maintenance activities have the potential to impact locations of burrowing owls, as many large canals support burrowing owls, such as the canal along the south side of Laurel Avenue and the Empire Westside Main Canal, where several burrowing owls were identified in previous surveys in the area. Between the times of maintenance activities and recolonization, the burrowing owls would take up temporary residence elsewhere.

<u>San Joaquin Kit Fox</u>

The San Joaquin kit fox is a federally-listed Endangered species, and a California-listed Threatened species. The smallest North American member of the dog family (Canidae), the kit fox historically occupied the dry plains of the San Joaquin Valley, from San Joaquin County to southern Kern County. Local surveys, research projects, and incidental sightings indicate that kit fox currently occupy available habitat on the San Joaquin Valley floor and in the surrounding foothills.

Kit foxes prefer open, arid habitats with loose soils. In the southern and central portion of the Central Valley, kit foxes are found in valley sink scrub, valley saltbrush scrub, upper Sonoran subshrub scrub, and annual grassland. Kit foxes may also be found in grazed grasslands, urban settings, and in areas adjacent to tilled or fallow fields. They require underground dens to raise pups, regulate body temperature, and avoid predators and other adverse environmental conditions. In the central portion of their range, they usually occupy burrows excavated by small mammals such as California ground squirrels. Kit fox are primarily carnivorous, feeding on squirrels, black-tailed hares, desert cottontails, rodents, insects, and ground-nesting birds.

Conditions in the project area consist predominantly of cultivated and fallow agricultural fields, which are generally unsuitable for foraging kit fox. A few burrows were observed that were of suitable dimensions for kit fox, but most of these burrows were or appeared to be occupied by California ground squirrels, a burrowing owl, or consisted of pipes either installed in the ground or laying on top of the ground. Having been modified for agricultural use, the project site provides a limited prey base especially in the cultivated fields and, therefore, constitutes poor foraging habitats for kit fox. No kit fox, or their sign, were observed during the any of the site visits by LOA ecologists between 2011 and 2020.

According to records of kit fox sightings in the region, there have been a total of 23 historical (1975-2000) sightings within the 10 miles of the Grape Solar Project site. All of these sightings occur at least 7.0 miles from the project site. (For a map showing the locations of these kit fox sightings, see Figure 4 in LOA's biological report, contained in Appendix B of this document.) Considering the highly disturbed condition of the project site, its isolation from extant kit fox populations, and its marginal to poor suitability as foraging or denning habitat, it is unlikely any kit fox have taken up residence within the Grape Solar site or access corridor. Based on the distribution of kit fox occurrences in the vicinity, the project area may only occasionally be used for regional movements of individual kit fox. Multiple large irrigation canals and drainage ditches running through the project area may act as movement corridors; however, should a kit fox utilize these corridors, the fox would have to travel through miles of marginal to poor habitat before reaching the Grape Solar project site, which itself holds little habitat value.

<u>Swainson's Hawk</u>

The Swainson's hawk is designated as a California Threatened species, and has no federal listing status. The loss of agricultural lands (i.e., foraging habitat) to urban development and additional threats such as riverbank protection projects have contributed to its decline.

Swainson's hawks are large, broad-winged, broad-tailed hawks and have a high degree of mate and territorial fidelity. In the Central Valley they arrive at their nesting sites in March or April. The nest is likely to be a large stick nest (3 to 4 feet in diameter) constructed in a tree. In the Central Valley, Swainson's hawks typically nest in large trees within or peripheral to riparian systems adjacent to suitable foraging habitats. Other suitable nest sites include lone trees, groves of trees such as oaks, other trees in agricultural fields, and mature roadside trees. The young hatch sometime between March and July and do not leave the nest until some 4 to 6 weeks later. Swainson's hawks forage in large, open fields with abundant prey, including grasslands or lightly grazed pastures, alfalfa and other hay crops, and certain grain and row croplands.

There are 37 Swainson's hawk nests within a 10-mile radius of the Grape Solar Project site, with the nearest nest site located 3.0 miles to the east of the Grape Solar site. (For a map showing Swainson's hawk nests, see Figure 1 in Appendix D of LOA's biological report, which is contained in Appendix B of this document.) Between 2011 and 2019, LOA biologists conducted multiple surveys for Swainson's hawk nests in the project area. The surveys found no nest sites within the Grape Solar Project site. On several occasions during the surveys, a number of Swainson's hawks were observed foraging in agricultural fields in the project vicinity.

Based on their field surveys, LOA biologists concluded that Swainson's hawks may utilize portions of the Grape Solar Project site for foraging. Nesting is unlikely due to the absence of suitable nest trees within the project site. There is only one moderately suitable cottonwood tree within the canal along the unimproved 25th Avenue alignment near the northwest corner of the project site. Therefore, Swainson's hawks may nest in suitable trees located within a half mile of the project site (which is the typical construction-free buffer distance from active nest sites).

Other Migratory Birds

Other migratory birds include most bird species with the exception of house sparrow and European starling, among a few other non-native birds. Migratory birds and their nests are protected under the Federal Migratory Bird Treaty Act of 1918 and California Fish and Game Code (Sections 3503 and 3513). Between approximately February 1 and August 31, migratory birds nest throughout California and the Central Valley on the ground and in grasses, shrubs, and trees.

Ground nesting birds such as burrowing owl and killdeer, among other disturbance-tolerating birds, may utilize the ground and agricultural vegetation of the Grape Solar Project site for nesting. Trees in and alongside the canals on the site or adjacent to the site may also be used by tree-nesting birds.

Jurisdictional Waters

Jurisdictional waters include rivers, creeks, and drainages that are under the regulatory authority of the U.S. Army Corps of Engineers (USACE), the CDFW, and/or the California Regional Water Quality Control Board (RWQCB). The USACE regulates the filling or grading of jurisdictional waters under the authority of Section 404 of the Clean Water Act. The extent of jurisdiction within drainage channels is defined by "ordinary high water marks" on opposing channel banks. The nearest known water of the U.S. is the Kings River, which is approximately 2.2 miles east of the project site at its nearest point.

Two large irrigation canals run along the western and eastern sides of the Grape Solar Project site, and one large and two smaller canals run through the project itself; however, these canals do not receive water from the Kings River, which is at a lower elevation than the Grape Solar site. Artificial waterways such as canals are typically not claimed by the agencies unless they receive water from a Known Water of the U.S., and then return water to a Known Water of the U.S. Thus, even if the canals on the Grape Solar site received water from a Known Water of the U.S., the Kings River, those waters do not return to the Kings River. As such, those canals do not fall under the jurisdiction of the USACE. Therefore, Waters of the U.S. are absent from the site.

The canals of the Grape Solar Project site may be claimed as jurisdictional by the RWQCB under the broader definition of "Waters of State" under the Porter-Cologne Water Quality Control Act. Thus, although the canals do not fall under federal jurisdiction, the RWQCB may assert jurisdiction over those portions of the canals on the Grape Solar site that function as wetlands.

The CDFW has jurisdiction over the bed and bank of natural drainages and lakes according to provisions of Section 1601 and 1602 of the California Fish and Game Code. The CDFW typically only asserts jurisdiction over ponds, lakes, and natural drainages or manmade features that replace natural drainages and, therefore, is unlikely to regulate alterations to the manmade canals within the Grape Solar Project site.

For a detailed discussion of jurisdictional waters, see the LOA biological report in Appendix B of this document.

Wildlife Movement Corridors

Wildlife movement corridors are areas where regional wildlife populations regularly and predictably move during dispersal or migration. Movement corridors in California are typically associated with valleys, rivers and creeks supporting riparian vegetation, and ridgelines. The nearest significant riparian corridor that likely facilitates regional movement of wildlife is the Kings River to the northeast of the Grape Solar Project site. This riparian area is located approximately 2.5 miles to the northeast of the Grape Solar site, the point at which the natural riparian corridor of the river becomes an unvegetated artificial channel south of the SR-41 bridge.

The canals within and adjacent to the Grape Solar Project site can function as movement corridors for the regular home range or dispersal movements of native wildlife, including special status species.

Designated Critical Habitat

The USFWS often designates areas of "critical habitat" when it lists species as threatened or endangered. Critical habitat is a specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. There are no designated critical habitat areas in the project vicinity.

Natural Communities of Special Concern

Natural communities of special concern are those that are of limited distribution, have significant biological diversity, or provide important habitat for special status species. The California Department of Fish and Wildlife is responsible for the classification and mapping of all natural communities in California. Natural communities are assigned state and global ranks according to their degree of imperilment. Examples of natural communities of special concern in the vicinity of the project site include vernal pools, such as those found east of the Kings River, and various types of riparian forest, such as those found along the Kings River to the northwest. The vegetation associations present on the project site are dominated by non-native species, and are not considered natural communities of special concern.

Habitat Conservation Plans (HCPs)

The only HCP that may apply to the Grape Solar Project is PG&E's "San Joaquin Valley Operations and Maintenance Habitat Conservation Plan." This HCP covers 23 wildlife species and 42 plant species for 33 routine operations and maintenance activities for PG&E's electric and gas transmission and distribution systems within nine counties in the San Joaquin Valley, including Kings County. The HCP prescribes best management practices to ensure that PG&E's operational and maintenance activities comply with the federal and state Endangered Species Acts. The proposed project is within the boundaries of the HCP. Although the HCP mainly covers operational and maintenance activities, it also covers small construction projects such as minor extensions of electrical lines (J&S 2006).

There are no other HCPs or Natural Community Conservation Plans that cover the project area. However, the USFWS has adopted the *Recovery Plan for Upland Species of the San Joaquin Valley* which covers 34 species of plants and animals that occur in the San Joaquin Valley. The majority of these species occur in arid grasslands and scrublands of the San Joaquin Valley and the adjacent foothills and valleys. The plan includes information on recovery criteria, habitat protection, umbrella and keystone species, monitoring and research program, adaptive management, and economic and social considerations. The only species addressed in the recovery plan that potentially occurs in the project vicinity is the San Joaquin kit fox, although no sightings of this species have been recorded in the immediate vicinity of the Grape Solar Project site, as discussed above. The Recovery Plan does not identify the project area or any other lands in the vicinity as areas that should be protected as Specialty Reserve Areas, Wildlife-Compatible Farmland to be Maintained, or Areas Where Connectivity and Linkages Should be Promoted (USFWS 1998).

Environmental Evaluation

a) Would the project 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 the California Department of Fish and Game or U.S. Fish and Wildlife Service?

<u>**Less-than-Significant Impact with Mitigation Incorporated**</u>. The Grape Solar Project would have a potentially significant impact upon three species of wildlife, including: San Joaquin kit fox, a federally-listed Endangered species and a California-listed Threatened species; burrowing owl, a California Species of Special Concern; and American badger, a California Species of Special Concern. The project could also have a potentially significant impact upon ground nesting bird species, which are protected under the Migratory Bird Treaty Act. There is also a concern with cumulative impacts to foraging habitat of the Swainson's hawk, a California-listed Threatened species. The potential project impact to each of these special status species is discussed below, along with mitigation measures that would reduce the impacts to *less-than-significant* levels.

San Joaquin kit fox

Kit fox infrequently use the heavily farmed areas in the project vicinity as is evident from the lack of sightings within at least 7.0 miles of the Grape Solar project site over the past 45 years. While the lands in the project area do not provide suitable forage and denning habitat for kit foxes, there is a small potential that kit fox may occasionally traverse the site vicinity while dispersing to another location. The Grape Solar Project is expected to result in a less-than-significant impact on kit fox foraging and denning habitat, and it is not expected to impede regional movement patterns as their occurrence on or near the Grape Solar site is expected to be rare.

Although the Grape Solar Project site does not provide suitable kit fox habitat, any kit foxes traversing the area during the construction phases could be harmed, injured or killed. Therefore, there is a potentially significant impact to individual kit foxes, should they traverse the Grape Solar site during construction. The potential impacts to San Joaquin kit fox would be reduced to a *less-than-significant* levels through implementation of the following mitigation measure.

<u>Mitigation Measure BIO-1: San Joaquin Kit Fox Protection</u>. *In order to minimize the potential for impacts to San Joaquin kit fox, the following measures shall be implemented in conjunction with the construction of the Grape Solar Project:*

a. *<u>Pre-construction Surveys</u>. Pre-construction surveys shall be conducted no less than 14 days and no more than 30 days prior to the beginning of ground disturbance, construction activities, and/or any project activity likely to impact the San Joaquin kit fox. These surveys shall be conducted in accordance with the "U.S. Fish and Wildlife Service Standardized Recommendations* for *Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance" (USFWS 2011). The primary objective is to identify San Joaquin kit fox habitat features (e.g., potential dens and refugia) on the project site and evaluate their use by San Joaquin kit fox. If an active San Joaquin kit fox den is detected within or immediately adjacent to the area of work, the USFWS shall be contacted immediately to determine the best course of action.*

b. *<u>Kit Fox Avoidance Measures</u>. Should San Joaquin kit fox be found using the Grape Solar project site during preconstruction surveys, the construction activity shall avoid the habitat occupied by kit fox and the Sacramento Field Office of the USFWS and Fresno Field Office of CDFW shall be notified.*

c. *<u>Employee Education Program</u>. Prior to the start of construction, the applicant shall retain a qualified biologist to conduct an on-site training session to educate all construction staff on the San Joaquin kit fox. This training shall include a description of the San Joaquin kit fox, a brief summary of their biology, and a list of minimization measures and instructions on what to do if a San Joaquin kit fox is observed within the Grape Solar project site and access corridor.*

d. *<u>Minimization of Potential Disturbance to Kit Fox</u>. Whether or not kit foxes are found to be present, all permanent and temporary construction activities and other types of project-related activities shall be carried out in a manner that minimizes disturbance to San Joaquin kit fox. Minimization measures include, but are not limited to: restriction of project-related vehicle traffic to established roads, construction areas, and other designated areas; inspection and covering of structures (e.g., pipes), as well as installation of escape structures, to prevent the inadvertent entrapment of San Joaquin kit fox; restriction of rodenticide and herbicide use; and proper disposal of food items and trash. The full list of protection measures required by the USFWS during construction and operation contained in USFWS Standardized Recommendations (USFWS 2011), and is presented in Table BIO-1. The protection measures set forth in Table BIO-1 are fully incorporated into this mitigation measure by reference.*

e. *<u>Mortality Reporting</u>. The Sacramento Field Office of the USFWS and the Fresno Field Office of CDFW shall be notified in writing within three working days in case of the accidental death of or injury to a San Joaquin kit fox during project-related activities. Notification must include the date, time, location of the incident or of the finding of a dead or injured animal, and any other pertinent information.*

Table BIO-1

U.S. FISH AND WILDLIFE SERVICE STANDARDIZED RECOMMENDATIONS
FOR PROTECTION OF THE ENDANGERED SAN JOAQUIN KIT FOX PRIOR TO OR DURING GROUND DISTURBANCE

CONSTRUCTION AND ON-GOING OPERATIONAL REQUIREMENTS

1. Project-related vehicles should observe a daytime speed limit of 20-mph throughout the site in all project areas, except on county roads and State and Federal highways; this is particularly important at night when kit foxes are most active. Night-time construction should be minimized to the extent possible. However if it does occur, then the speed limit should be reduced to 10-mph. Off-road traffic outside of designated project areas should be prohibited.
2. To prevent inadvertent entrapment of kit foxes or other animals during the construction phase of a project, all excavated, steep-walled holes or trenches more than 2-feet deep should be covered at the close of each working day by plywood or similar materials. If the trenches cannot be closed, one or more escape ramps constructed of earthen-fill or wooden planks shall be installed. Before such holes or trenches are filled, they should be thoroughly inspected for trapped animals. If at any time a trapped or injured kit fox is discovered, the Service and the California Department of Fish and Wildlife (CDFW) shall be contacted as noted under measure 13 referenced below.
3. Kit foxes are attracted to den-like structures such as pipes and may enter stored pipes and become trapped or injured. All construction pipes, culverts, or similar structures with a diameter of 4-inches or greater that are stored at a construction site for one or more overnight periods should be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a kit fox is discovered inside a pipe, that section of pipe should not be moved until the USFWS has been consulted. If necessary, and under the direct supervision of the biologist, the pipe may be moved only once to remove it from the path of construction activity, until the fox has escaped.
4. All food-related trash items such as wrappers, cans, bottles, and food scraps should be disposed of in securely closed containers and removed at least once a week from a construction or project site.
5. No firearms shall be allowed on the project site. (This prohibition does not apply to law enforcement personnel such as Sheriff's Deputies or the Fire Marshal.)
6. No pets, such as dogs or cats, should be permitted on the project site to prevent harassment, mortality of kit foxes, or destruction of dens.
7. Use of rodenticides and herbicides in project areas should be restricted. This is necessary to prevent primary or secondary poisoning of kit foxes and the depletion of prey populations on which they depend. All uses of such compounds should observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and other State and Federal legislation, as well as additional project-related restrictions deemed necessary by the USFWS. If rodent control must be conducted, zinc phosphide should be used because of a proven lower risk to kit fox. A representative shall be appointed by the project proponent who will be the contact source for any employee or contractor who might inadvertently kill or injure a kit fox or who finds a dead, injured or entrapped kit fox. The representative will be identified during the employee education program and their name and telephone number shall be provided to the USFWS.
8. A representative shall be appointed by the project proponent who will be the contact source for any employee or contractor who might inadvertently kill or injure a kit fox or who finds a dead, injured or entrapped kit fox. The representative will be identified during the employee education program and their name and telephone number shall be provided to the USFWS

(Continued on next page.)

Table BIO-1 (Cont'd)

U.S. FISH AND WILDLIFE SERVICE STANDARDIZED RECOMMENDATIONS FOR PROTECTION OF THE ENDANGERED SAN JOAQUIN KIT FOX PRIOR TO OR DURING GROUND DISTURBANCE

CONSTRUCTION AND ON-GOING OPERATIONAL REQUIREMENTS

9. An employee education program should be conducted for any project that has anticipated impacts to kit fox or other endangered species. The program should consist of a brief presentation by persons knowledgeable in kit fox biology and legislative protection to explain endangered species concerns to contractors, their employees, and military and/or agency personnel involved in the project. The program should include the following: A description of the San Joaquin kit fox and its habitat needs; a report of the occurrence of kit fox in the project area; an explanation of the status of the species and its protection under the Endangered Species Act; and a list of measures being taken to reduce impacts to the species during project construction and implementation. A fact sheet conveying this information should be prepared for distribution to the previously referenced people and anyone else who may enter the project site.
10. Upon completion of the project, all areas subject to temporary ground disturbances, including storage and staging areas, temporary roads, pipeline corridors, etc., should be re-contoured if necessary, and revegetated to promote restoration of the area to pre-project conditions. An area subject to "temporary" disturbance means any area that is disturbed during the project, but after project completion will not be subject to further disturbance and has the potential to be revegetated. Appropriate methods and plant species used to revegetate such areas should be determined on a site-specific basis in consultation with the USFWS, California Department of Fish and Wildlife (CDFW), and revegetation experts.
11. In the case of trapped animals, escape ramps or structures should be installed immediately to allow the animal(s) to escape, or the USFWS should be contacted for guidance.
12. Any contractor, employee, or military or agency personnel who are responsible for inadvertently killing or injuring a San Joaquin kit fox shall immediately report the incident to their representative. This representative shall contact the CDFW immediately in the case of a dead, injured or entrapped kit fox. The CDFW contact for immediate assistance is State Dispatch at (916) 445-0045. They will contact the local warden or Mr. Paul Hoffman, the wildlife biologist, at (530) 934-9309. The USFWS should be contacted at the numbers below.
13. The Sacramento Fish and Wildlife Office and CDFW shall be notified in writing within three working days of the accidental death or injury to a San Joaquin kit fox during project related activities. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal and any other pertinent information. The USFWS contact is the Chief of the Division of Endangered Species, at the addresses and telephone numbers below. The CDFW contact is Mr. Paul Hoffman at 1701 Nimbus Road, Suite A, Rancho Cordova, California 95670, (530) 934-9309.
14. New sightings of kit fox shall be reported to the California Natural Diversity Database (CNDDB). A copy of the reporting form and a topographic map clearly marked with the location of where the kit fox was observed should also be provided to the Service at the address below.

Any project-related information required by the Service or questions concerning the above conditions or their implementation may be directed in writing to the U.S. Fish and Wildlife Service at:

Endangered Species Division
2800 Cottage Way, Suite W2605
Sacramento, California 95825-1846
(916) 414-6620 or (916) 414-6600

f. *<u>Wildlife-friendly Fencing</u>. The perimeter fencing surrounding each phase of the Grape Solar Project shall consist of wildlife-friendly or permeable fencing that allows San Joaquin kit fox and other wildlife to move through the site unimpeded. The bottom of the perimeter fencing shall be 5 to 7 inches above the ground, as measured from the top of the ground to the lowest point of the fence. The bottom of the fence edges shall be knuckled (wrapped back to form a smooth edge) to allow wildlife to pass through safely. The fencing shall not be electrified.*

Raptors and Migratory Birds

In addition to the Swainson's hawk and burrowing owl (discussed below), several other raptor species such as the northern harrier, prairie falcon, peregrine falcon, and red-tailed hawk are known to forage in the project area. Additionally, the Grape Solar project provides nesting habitat for a number of migratory bird species, including, but not limited to, the snowy plover, black-necked stilt, great-horned owl, common raven, loggerhead shrike, house finch, Brewer's blackbird, and tricolored blackbird. Nearly all native bird species are protected by the federal Migratory Bird Treaty Act. The canal habitat, as well power poles and barren ground on the Grape Solar site and access corridor provide potential nesting habitat for these species. If birds were to nest in these areas prior to construction, project-related activities could result in the abandonment of active nests or direct mortality to these birds. Construction activities that adversely affect the nesting success of raptors or result in mortality of individual birds constitute a violation of state and federal laws (see Section 3.2.2 and 3.2.3 of the LOA report in Appendix B) and would be represent a significant impact.

The potential impacts to ground nesting raptors and migratory birds would be reduced to a *less-than-significant* levels through implementation of the following mitigation measure.

<u>Mitigation Measure BIO-2: Protection for Nesting Raptors and Migratory Birds</u>. *In order to minimize construction disturbance to active raptor and other migratory bird nests, the following measures shall be implemented in conjunction with the construction of the Grape Solar Project:*

a. *<u>Pre-construction Surveys</u>. If tree removal, site preparation, grading, or construction is planned to occur within the breeding season (February 1 - August 31), a qualified biologist shall conduct pre-construction surveys for active migratory bird nests within 14 days of the onset of these activities. Pre-construction surveys shall be repeated if construction halts for more than 14 days. If construction activity is planned to commence outside the breeding period, no pre-construction surveys are required for nesting birds and raptors.*

b. *<u>Monitoring Active Nests</u>. Should any active nests be discovered in or near planned construction zones, a qualified biologist shall continuously monitor identified nests for the first 24 hours prior to any construction related activities to establish a behavioral baseline. Once work commences, continuously monitor all nests to detect any behavioral changes as a result of the project. If behavioral changes are observed, stop the work causing that change and consult with the California Department of Fish and Wildlife for additional avoidance and minimization measures*.

c. *<u>Exclusion Zones for Active Nests</u>. Alternatively, should any active nests be discovered in or near the planned construction zones, the biologist shall* establish a *250-foot construction-*

free buffer around the nest for non-listed birds, 500-foot buffer for unlisted raptors, and a half-mile for listed bird species. This buffer shall be identified on the ground with flagging or fencing, and shall be maintained until the biologist has determined that the young have fledged. Variance from these setback distances may be allowed if a qualified biologist provides compelling biological or ecological reason to do so and if CDFW is notified in advance of implementation of a no disturbance buffer variance.

d. Tailgate Training for Workers. All construction and operations workers on the Grape Solar Project shall be trained by a qualified biologist. The tailgate training shall include a description of the Migratory Bird Treaty Act, instructions on what to do if an active nest is located, and the importance of capping pipes and pipe-like structures standing upright in order to avoid birds falling into the pipes and getting stuck.

e. Capping of Hollow Poles and Posts. Should any vertical tubes, such as solar mount poles, chain link fencing poles, or any other hollow tubes or poles be utilized on the Grape Solar project site, the poles shall be capped immediately after installation to prevent entrapment of birds.

Burrowing Owl

Nesting Habitat

The Grape Solar project site provides suitable nesting/denning habitat for burrowing owls in the form of California ground squirrel burrows along the edges of the agricultural fields, and in and along the canals, and in the form of pipes in or on the ground. The Grape Solar site also provides foraging habitat within the agricultural fields. During LOA's 2018 surveys, three pair of burrowing owls and one single burrowing owl were observed 2.0 miles north of the project site along the canal running along the south side of Laurel Avenue, and one burrowing owl was observed 1.5 miles north of the northwest corner of project site. No burrowing owls were observed on the project site or access corridor during LOA's 2019 or 2020 surveys. Previous surveys in 2011 and 2012 identified the closest known occurrence of burrowing owls to the site, which were within a half mile and within a mile to the south of the site in a canal. Since the Grape Solar Project would not involve disturbance to the canals on or adjacent to the site, the known locations of potential burrowing owl burrows along the on-site canals would be avoided. In addition, adequate suitable foraging habitat exists to the east of the Grape Solar Project site to support these owls.

For any burrowing owls that occur elsewhere within the Grape Solar site, both breeding and foraging habitat could be lost due to the project. This would constitute a significant impact to burrowing owl foraging and breeding habitat.

These small raptors are protected under the federal Migratory Bird Treaty Act and California Fish and Game Code. Ground disturbing activities associated with construction of the Grape Solar Project may also result in the mortality of burrowing owls, as they are known to retreat into their burrows ahead of approaching heavy equipment. Mortality of individual birds would be a violation of state and federal law, and would constitute a significant environmental impact.

Foraging Habitat

In its analysis of available foraging habitat for burrowing owls within the Grape Solar Project site, LOA identified approximately 423 acres of habitat suitable for burrowing owls year-round, 953 acres suitable seasonally, and 353 acres of unsuitable habitat. Within two miles of the Grape Solar Project site, and outside areas to be impacted by other solar development within Westlands Solar Park, LOA identified approximately 1,473 acres of habitat suitable for burrowing owls year-round, 2,725 acres suitable seasonally, and 2,790 acres of unsuitable habitat. Based on the abundance of suitable foraging habitat nearby, it was concluded that upon the solar development of the suitable foraging habitat areas of the Grape Solar Project, adequate suitable foraging habitat would still exist outside of the WSP Plan Area to support burrowing owls in the documented burrowing owl locations in the project vicinity. Therefore, the Grape Solar Project is not expected to result in significant impacts to burrowing owl habitat.

The potential impacts to burrowing owl nesting habitat would be reduced to a *less-than-significant* levels through implementation of the following mitigation measures.

Mitigation Measure BIO-3: Burrowing Owl Protection. *In order to minimize the potential for impacts to burrowing owls, the following measures shall be implemented, as necessary, in conjunction with the construction of the Grape Solar Project:*

a. Pre-Construction Surveys. Pre-construction surveys shall be conducted for burrowing owls by a qualified biologist no more than 14 days prior to the onset of ground-disturbing activity. Pre-construction surveys shall be repeated if construction halts for more than 14 days. These surveys shall be conducted in accordance with the Staff Report on Burrowing Owl Mitigation *(CDFG 2012) or the most recent CDFW guidelines. The surveys shall cover all areas of suitable habitat within the planned construction zones.*

b. Avoidance of Active Nests During Breeding Season. If pre-construction surveys are undertaken during the breeding season (February through August) and active nest burrows are located within or near construction zones, a construction-free buffer of 150 to 250 feet shall be established around all active owl nests. The specific dimensions of the buffer zone in each case shall be established by a qualified biologist based on site conditions and the level of intensity of the disturbance activity. The buffer zones shall be enclosed with temporary fencing, and construction equipment and workers shall not be allowed to enter the enclosed setback areas. These buffer zones shall remain in place for the duration of the breeding season. After the breeding season (i.e., once all young have left the nest), passive relocation of any remaining owls may take place, but only under the conditions described below.

c. Avoidance of Occupied Burrows During Non-Breeding Season, and Passive Relocation of Resident Owls. During the non-breeding season (September through January), any burrows occupied by resident owls in areas planned for construction shall be protected by a construction-free buffer with a radius of 150 feet around each active burrow. Passive relocation of resident owls is not recommended by CDFW where it can be avoided. If passive relocation is not avoidable, resident owls may be passively relocated according to a relocation plan prepared by a qualified biologist.

d. <u>Tailgate Training for Workers</u>. All construction workers shall attend a tailgate training session conducted by a qualified biologist. The training is to include a description of the species, a brief summary of its biology, and minimization measures and instructions on what to do if a burrowing owl is observed within or near a construction zone.

Swainson's Hawk

<u>Impacts to Swainson's Nesting Habitat</u>

As discussed under 'Biological Setting,' there are no Swainson's hawk nests on Grape Project site or in the vicinity. The nearest previously observed nest is located 3 miles east of the Grape Solar site. Only one marginally suitable nesting tree occurs on the project site within the canal adjacent to the 25th Avenue alignment at the north site boundary. The off-site former tailwater pond, which is near the northwestern corner of the project site, supports potentially suitable nesting habitat. Therefore, Swainson's hawks may nest in suitable trees located within a half mile of the project site (the typical construction-free buffer distance from active nest sites). Construction activities occurring near an active Swainson's hawk nest could adversely affect nesting success or result in mortality of individual birds and would be considered a significant impact under CEQA. Therefore, the potential impact to nesting habitat for Swainson's hawk due to construction of the Grape Solar Project would represent *a potentially significant impact*.

<u>Mitigation Measure BIO-4: Swainson's Hawk Protection</u>. *In order to minimize the potential for impacts to Swainson's hawks, the following measures shall be implemented, as necessary, in conjunction with the construction of the Grape Solar Project:*

a. <u>Pre-Construction Surveys</u>. During the nesting season prior to the construction on the Grape Solar project site within a half-mile of a potential nest tree, preconstruction surveys shall be conducted within the construction zones and adjacent lands to identify any nesting pairs of Swainson's hawks. These surveys will conform to the guidelines of CDFW as presented in RECOMMENDED TIMING AND METHODOLOGY FOR SWAINSON'S HAWK NESTING SURVEYS IN CALIFORNIA'S CENTRAL VALLEY, Swainson's Hawk Technical Advisory Committee, May 31, 2000. *No preconstruction surveys are required for construction activity located farther than a half-mile from a potential nest tree.*

b. <u>Establish Buffers</u>. Should any active nests be discovered in or near proposed construction zones, the qualified biologist shall establish a suitable construction-free buffer around the nest. This buffer shall be identified on the ground with flagging or fencing, and shall be maintained until the biologist has determined that the young have fledged.

c. <u>Tailgate Training</u>. All workers on the construction of the project shall attend tailgate training that includes a description of the species, a brief summary of its biology, and minimization measures and instructions on what to do if a Swainson's hawk is observed on or near the construction zone.

<u>Project Impacts to Swainson's Hawk Foraging Habitat</u>

Swainson's hawks may occasionally forage on the Grape Solar Project site, but given the regional abundance of foraging habitat, the loss of foraging habitat resulting from the Grape Solar Project would represent a *less-than-significant* impact to foraging habitat for Swainson's hawk.

<u>Cumulative Impacts to Swainson's Hawk Foraging Habitat</u>

As mentioned, Swainson's hawks are known to forage in the vicinity of the Grape Solar Project site. As part of its biological assessment for the Program EIR on the Westlands Solar Park Master Plan and Gen-Tie Corridors Plan, conducted in 2017, LOA completed a comprehensive analysis of potential impacts to Swainson's hawk foraging habitat associated with development of the WSP Master Plan area and all other approved, pending, and completed projects within a 10-mile radius of the WSP plan area (WWD 2017). The analysis identified all known Swainson's hawk nests that were previously observed during surveys by LOA or others. In 2018 and 2019, LOA biologists conducted follow-up surveys to identify currently active nests. It was concluded that there are currently 37 nesting pairs of Swainson's hawks within the 10-mile radius study area. In 2020, LOA biologists also reviewed and updated their detailed 2017 analysis of foraging habitat within a 10-mile radius of the WSP plan area and concluded that abundant habitat that would remain after full development of the WSP plan area, and all other cumulative projects (including projects proposed since 2017) within this 10-mile radius, would be more than sufficient to support all of the 37 known Swainson's hawk nests within this radius, with surplus capacity to support additional nesting pairs. The full analysis is contained in Appendix D of LOA's biological report, which is contained in Appendix B of this document, and is summarized below.

LOA's analysis of potential cumulative impacts to Swainson's hawk foraging habitat employed a study methodology established by Estep Environmental Consulting (Estep), and which has been applied in similar studies on previous solar projects in Kings County. The first step in this analysis was to make a determination as to the amount of surplus foraging habitat available that is not considered to be required by existing Swainson's hawks that are currently nesting in the area. Based on LOA's application of Estep's methodology, it was calculated that there is currently a surplus of 130,718 acres of suitable foraging habitat within the study area. (See LOA's Biological Assessment in Appendix B of this document for a full description of the habitat calculations.)

In order to determine the potential cumulative impacts to foraging habitat, all of the pending, approved, and completed solar projects within the study area were identified and mapped. It was determined that the 21 cumulative projects (including the Grape Solar project) occupy a total of 32,766 acres within the study area (this includes the entire WSP plan area of 20,938 acres). For purposes of analysis, this entire acreage was conservatively assumed to comprise suitable foraging habitat, whereas the actual total would be less after subtracting acreage in tree crops and vineyards which provide little or no foraging value for Swainson's hawks.

In order to determine if this cumulative loss of foraging habitat represented a significant cumulative impact, Estep established that a reduction of surplus habitat to less than 70 percent relative to pre-project conditions would represent a cumulatively significant impact (Estep 2012). As presented in LOA's Biological Assessment (see Appendix B of this document), it was calculated that the cumulative projects would reduce the total surplus foraging habitat in the study area to 97,952 acres (i.e., 130,718 acre pre-project surplus minus 32,766 acres cumulative loss). This remaining acreage of surplus foraging area represents 74.9 percent of the pre-project total. Since the remaining surplus foraging acreage is greater than 70 percent of the pre-project surplus foraging acreage in the study area, the cumulative impact to the Swainson's hawk foraging acreage in the study area was determined to be *less than significant*.

American Badgers

Given the observations of American badgers, a California Species of Special Concern, on nearby lands with similar habitats to those of the Grape Solar Project site, the potential exists that the American badger may reside within the Grape Solar site. No badgers or badger burrows were observed in the area during any of the surveys of the project site conducted from 2011 through 2020. Potential badger habitat was found on the Grape Solar site in the form of fallow fields. While the occurrence of badgers is expected to be unlikely, it cannot be ruled out. As such, there is a potential for significant impact to American badgers.

Mitigation Measure BIO-5: American Badger Mitigation. *The following measures shall be implemented to minimize impacts to the American badger, as necessary, in conjunction with the construction of the Grape Solar Project:*

a. Preconstruction Surveys for American Badger. During the course of pre-construction surveys prescribed for other species, a qualified biologist shall also determine the presence or absence of badgers prior to the start of construction. If badgers are found to be absent, a report shall be written to the applicant so stating and no other mitigations for the protection of badgers would be warranted.

b. Avoidance of Active Badger Dens and Monitoring. If an active badger den is identified during pre-construction surveys within or immediately adjacent to an area subject to construction, a construction-free buffer of up to 300 feet shall be established around the den. Once the biologist has determined that the badger(s) have vacated the burrow, the burrow can be collapsed or excavated, and ground disturbance can proceed. Should the burrow be determined to be a natal or reproductive den, and because badgers are known to use multiple burrows in a breeding burrow complex, a biological monitor shall be present on-site during construction activities in the vicinity of the burrows to ensure the buffer is adequate to avoid direct impact to individuals or natal/reproductive den abandonment. The monitor shall be required on-site until it is determined that young are of an independent age and construction activities would not harm individual badgers.

c. Tailgate Training for Workers. All construction workers shall attend a tailgate training session conducted by a qualified biologist. The training is to include a description of the species, a brief summary of its biology, and minimization measures and instructions on what to do if an American badger is observed.

Loss of Habitat for Special Status Plants

Three special status vascular plant species are known to occur in the vicinity of the project site: California jewel-flower, Kern mallow, and San Joaquin woollythreads. Because of the many decades of agricultural disturbance, habitat for these plant species is absent from the Grape Solar Project site. Therefore, the impacts to regional populations of these species would be *less than significant*.

Loss of Habitat for Special Status Animals Absent or Unlikely to Occur in the Project Area

Of the 38 special status animal species potentially occurring in the region, 24 species would be absent or unlikely to occur within the Grape Solar Project site due to unsuitable habitat conditions. These include the vernal pool fairy shrimp, valley elderberry longhorn beetle, California tiger salamander, western spadefoot, western pond turtle, Temblor legless lizard, coast horned lizard, blunt-nosed leopard lizard, giant garter snake, California glossy snake, San Joaquin whipsnake, American white pelican (nesting), black swift, Vaux's swift, western yellow-billed cuckoo, Nelson's antelope squirrel, giant kangaroo rat, Fresno kangaroo rat, Tipton kangaroo rat, short-nosed kangaroo rat, Tulare grasshopper mouse, American badger, San Joaquin kit fox, and ringtail. Construction of the Grape Solar Project would have no impact on these species because there is little or no likelihood that they are present.

Loss of Habitat for Special Status Animals that May Occur as Occasional or Regular Foragers on the Project Site

There are 14 species that may occasionally utilize the Grape Solar Project site for foraging or dispersal movements. These include: western snowy plover, mountain plover, white-faced ibis, Swainson's hawk, northern harrier, white-tailed kite, western burrowing owl, long-eared owl, loggerhead shrike, yellow-headed blackbird, tricolored blackbird, Townsends's big-eared bat, pallid bat, and California mastiff bat. LOA's biologists determined that the Grape Solar Project site does not provide regionally important foraging habitat for these species (see LOA Biological Assessment in Appendix B of this document). Considerable habitat suitable for migratory movements and winter foraging would continue to be available for these species on other lands within the region following development of the project. Therefore, project development would result in a *less-than-significant impact* on these species due to loss of foraging habitat.

b) Would the project 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 California Department of Fish and Game or U.S. Fish and Wildlife Service?

No Impact. As discussed in 'Biological Setting' above, LOA determined that the canals and ditches within and adjacent to the Grape Solar Project site do not meet the requirements of the USACE as a jurisdictional wetland. The construction of the Grape Solar Project is not planned or expected to encroach upon or physically alter any on-site or off-site canals. The agricultural lands that occupy the Grape Solar Project site are not considered sensitive habitats and do not provide significant habitat value to regional wildlife populations. Because riparian and other sensitive habitats are absent from the project site, construction of the Grape Solar Project and access corridor would have *no impact* on riparian habitat or other sensitive natural community.

c) Would the project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

No Impact. As discussed in 'Biological Setting' above, on-site waters, as contained in irrigation canals within and near the Grape Solar Project site, appear not to meet the jurisdictional requirements of the USACE as Waters of the United States. However, the canals that regularly contain water would be considered Waters of the State. Such waters would be subject to the jurisdiction of the Regional Water Quality Control Board. The construction of the Grape Solar Project is not planned or expected to encroach upon or physically alter any on-site or off-site canals. Because the project would avoid potential Waters of the U.S. and Waters of the State, as well as any associated wetlands or riparian habitat, potential project impacts would be *less-than-significant*.

d) Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Less-than-Significant Impact. It is likely that some species use the canals on and adjacent to the Grape Solar Project site as movement corridors, including San Joaquin kit fox. The project site likely has some small value for the regional movements of some wildlife species; however, the canal system has greater value when placed in a regional context. Since the development of the Grape Solar site as a solar generating facility would not affect existing canals, which would continue to be operated and managed as they are under current conditions, it is expected that wildlife that currently uses the canals for movement will continue to use the canal system to move through the area after the Grape Solar Project is completed.

To allow for ground movement of wildlife through the project site, all fencing enclosing the solar facility is planned to consist of "wildlife friendly" fencing with a continuous 5- to 7-inch separation from the top of the ground to the lowest point of the bottom of the fence along the entire fence. Such fencing will not be electrified.

In summary, wildlife currently using the Grape Solar Project site for movement are expected to continue to do so after project completion, given that wildlife friendly fencing will be installed around the Grape Solar Project and considering that the canal system will be retained within the solar facility, thus allowing for wildlife movement through the site unimpeded. Therefore, the Grape Solar Project would result in a *less-than-significant impact* on regional or local wildlife movements.

With respect to native wildlife nursery sites, the aquatic habitat associated with the irrigation canals on and adjacent to the Grape Solar site could provide nursery sites for native wildlife. Since these features would be avoided by the Grape Solar Project, the potential project impacts to wildlife nursery sites would be *less-than-significant*.

e) Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

No Impact. The "Resource Conservation Element" of the *2035 Kings County General Plan* contains several goals and policies pertaining to biological resources. The resource conservation goals of the Kings County General Plan relating to biological resources are summarized as follows: 1) protect the Kings River and associated riparian habitat; 2) preserve land that contains important natural plant and animal habitats; 3) maintain the quality of natural wetland areas; and 4) protect and manage riparian environments as valuable resources. The corresponding policies require biological assessments of proposed development projects, including coordination with the resource agencies and compliance with their permitting requirements, and mitigation for potential impacts to biological resources (Kings County 2010b). The project would assure consistency with the General Plan goals and policies on biological resource projection through completion of this environmental impact review pursuant to CEQA, including project incorporation of mitigations recommended by the resource agencies. Thus the Grape Solar Project would be consistent with the relevant General Plan goals and polices and would have *no impact* in terms of conflicts with those policies.

Kings County does not have any ordinances protecting biological resources, such as a tree preservation ordinance. However, General Plan Resource Conservation Policy E1.1.2 requires the preservation of healthy native trees as a primary objective in the review of development projects (Kings County 2010b). The Grape Solar Project site includes one small cottonwood tree within a canal near the north site boundary. However, since the canal would be avoided by the project, the project would have *no impact* in terms of a potential conflict with this tree preservation policy.

f) Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

No Impact. As discussed in 'Biological Setting' above, the only HCP that may apply to the Grape Solar Project is PG&E's "San Joaquin Valley Operations and Maintenance Habitat Conservation Plan." The proposed project is within the boundaries of the HCP. Although the HCP covers operational and maintenance activities, it also covers small construction projects such as minor extensions of electrical lines (J&S 2006). The HCP would likely cover the project's interconnection to PG&E's system (at the Gates Substation in Fresno County), but would not cover construction of Grape Solar Project itself. The mitigation measures identified above for protection of wildlife during project construction and operation would be compatible with the requirements of the HCP since they also ensure compliance with the federal and state Endangered Species Acts. Therefore, the project would have *no impact* in terms of potential conflict with this HCP.

The USFWS has adopted the *Recovery Plan for Upland Species of the San Joaquin Valley* which covers 34 species of plants and animals that occur in the San Joaquin Valley. The majority of these species occur in arid grasslands and scrublands of the San Joaquin Valley and the adjacent foothills and valleys. The only species covered in the recovery plan that potentially occurs in the project vicinity is the San Joaquin kit fox, although no sightings of this species have been recorded in the project area since 1981, as discussed above. The Recovery Plan does not identify the project site or any other lands in the vicinity as areas that should be protected as Specialty Reserve Areas, Wildlife-Compatible Farmland to be Maintained, or Areas Where Connectivity and Linkages Should be Promoted (USFWS 1998). Because the San Joaquin kit fox has a small potential to occur on the site, the mitigation measures identified above in MM Bio-1 would mitigate any potential project impacts to kit fox. Therefore, the Grape Solar Project would have *no impact* in terms of potential conflict with the "Recovery Plan."

The Grape Solar Project site is not covered by any other existing Habitat Conservation Plan (HCP) or Natural Community Conservation Plan (NCCP), or any other conservation plan adopted at the local, regional, state, or federal level. Therefore, the Grape Solar Project would have *no impact* in terms of potential conflict with any such plans.

REFERENCES – BIOLOGICAL RESOURCES

CDFG 2012	California Department of Fish and Game (CDFG). 2012. *Staff Report on Burrowing Owl Mitigation*. May 7. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=83843
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Estep 2017	Estep Environmental Consulting. 2017. *The Distribution and Abundance of Nesting Swainson's Hawks in the Vicinity of the Proposed American Kings Solar Project Site*. November. Contained (at page 260) in https://www.countyofkings.com/home/showdocument?id=19414
J&S 2006	Jones & Stokes (J&S). 2006. *Final PG&E San Joaquin Valley Operation & Maintenance Habitat Conservation Plan*. December. https://ecos.fws.gov/docs/plan_documents/thcp/thcp_838.pdf
Kings County 2010b	Kings County. 2010. *2035 Kings County General Plan – Resource Conservation Element*. Adopted January 26, 2010. http://www.countyofkings.com/home/showdocument?id=3112
LOA 2020	Live Oak Associates (LOA). 2020. *Grape Solar Project – Biological Assessment*. December. [Contained in Appendix B of this document.]
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USFWS 2011	U.S. Fish & Wildlife Service (USFWS). 2011. *U.S. Fish and Wildlife Service Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior To or During Ground Disturbance*. Prepared by Sacramento Fish and Wildlife Office, January. http://www.fws.gov/sacramento/es/Survey-Protocols-Guidelines/Documents/kitfox_standard_rec_2011.pdf
WWD 2017c	Westlands Water District (WWD). 2017. *Draft Program Environmental Impact Report – Westlands Solar Park Master Plan s Plan*. October. https://cs.westlandswater.org/resources/resources_files/misc/Environmental_Docs/201710/Vol1.pdf

4.5. CULTURAL RESOURCES

Would the project:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant	No Impact
a) Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?	☐	■	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	■	☐	☐
c) Disturb any human remains, including those interred outside of dedicated cemeteries?	☐	■	☐	☐

The evaluation in this section is based on the cultural resources report prepared by Basin Research Associates in January 2021. The Basin Research Associates report is kept administratively confidential by the Kings County Community Development Agency (CDA) pursuant to Government Code Section 6254, subdivision (r) and Section 6254.10.

The research conducted for the cultural resources report by Basin Research Associates included a prehistoric and historic site records search through the California Historical Resources Information System, Southern San Joaquin Valley Information Center, California State University (CSU) Bakersfield. In addition, Basin Research conducted a review of pertinent literature and archival records, and cultural resources compliance reports on other projects in the area, among other sources.

The Native American Heritage Commission (NAHC) was contacted concerning resources listed on the *Sacred Lands Inventory*. The NAHC record search was negative for Native American resources in the immediate project area, and seven tribes or knowledgeable individuals were recommended that could provide additional information. Information outreach letters or emails were sent to the seven parties. One response was received from the Santa Rosa Rancheria Tachi Yokut Tribe, which is the nearest federally recognized Indian tribe, and has conducted consultation with Kings County for solar projects in the area. The Tribe has provided recommended mitigation measures for cultural resources, which have been incorporated into this Initial Study/MND. Other Native American groups have generally deferred to the Tachi Yokut Tribe due to their proximity to the project area.

Basin Research Associates has conducted archaeological field reviews within the Westlands Solar Park Master Plan Area, including the Grape Solar Project site, from 2009 to 2020. No evidence of prehistoric or historically significant cultural resources was observed on the Grape Solar Project site or vicinity during the field reviews. The results of the field inventories indicate that the project site has a low sensitivity for surface resources.

Setting

Native American Resources

Ethnography

Prehistoric occupation and use of the general area dates from perhaps as early as 12,000 years ago. The wetland environment of the nearby Tulare Lake would have provided a favorable environment for prehistoric Native Americans due to the availability of resources such as fresh water, fish and large game. In the later period beginning about 1,500 years ago, subsistence began to focus on processing of acorns and other plant foods, with a decreased emphasis on hunting and fishing.

The project site was within the territory of the Southern Valley Yokuts tribe known as the *Tachi (Tache)*, whose territory extended from the north and west shores of Tulare Lake to the Kettleman Hills and foothills of the Coast Ranges. The *Tachi* village of *Waiu*, one of eight in Tachi territory, was located south of Lemoore along the west side of Mussel Slough where the present rancheria of the Santa Rosa Indian Community is located. The location of the Santa Rosa Indian Community of the Santa Rosa Rancheria, California (a.k.a. Santa Rosa Rancheria Tachi Yokut Tribe) conforms to the former site of the *Tachi* village of *Waiu.* The community, a federally-recognized Indian tribe, is located approximately 8.5 miles east/northeast of the project site between Jersey and Kent Avenues, west of 17th Avenue. The "Santa Rosa Rancheria" is a designated State of California Ethnic site.

Prehistoric Archaeology

The literature search by Basin Research found that no prehistoric resources have been recorded within or immediately adjacent to the project site, and that three prehistoric isolated finds have been recorded outside of the project site within a 1.5-mile radius. Isolated finds are not eligible for listing on either the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR).

> ***P-16-00194*** – This is an isolated prehistoric find 1.4 miles south of the southern project site boundary consisting of a chert core fragment within an area identified as the former western lakebed/shoreline of Tulare Lake. The find was noted two meters below the surface during construction monitoring. Isolated finds are not considered significant.
>
> ***P-16-00195*** – This is an isolated prehistoric find located 1.0 mile south of the southern project site boundary consisting of a ground stone portable metate fragment within an area identified as the former western lakebed/shoreline of Tulare Lake. This find was noted two meters below the surface during construction monitoring. Isolated finds are not considered significant.
>
> ***P-16-000196*** – This is an isolated prehistoric find 0.9 mile south of the southern project site boundary consisting of a gray obsidian flake with a heavy patina within an area identified as the former western lakebed/shoreline of Tulare Lake. The find was noted two meters below the surface during construction monitoring. Isolated finds are not considered significant.

In addition, several prehistoric resources have been recorded at locations from 1.5 to 7.5 miles south of the Grape Solar Project site. These resources are generally located along the western margins of the former Tulare Lake. These resources include four prehistoric sites (three of which included Native American remains), one combined prehistoric/historic-era sites, and 19 prehistoric isolates. None of these sites is listed on the State Office of Historic Preservation's *Archaeological Determinations of Eligibility* for Kings County.

No other prehistoric or combined prehistoric/historic-era sites or isolates have been recorded in the vicinity of the Grape Solar Project site or access corridor. No National Register of Historic Places or California Register of Historical Resources eligible or listed historic properties/cultural resources, or traditional cultural places (TCPs) have been identified in or adjacent to the Grape Solar project site or access corridor.

The Native American Heritage Commission (NAHC) has indicated that a search of the sacred land file was negative for the presence of Native American resources in the immediate area of the Grape Solar site and access corridor.

Historic-Era Resources

The literature search by Basin Research identified one historic-era resource which is an unrecorded portion of a recorded linear resource (see P-16-000136 below) which passes through the project site.

> ***P-16-000136*** – This historic-era built environment site, an electrical transmission line associated with the Henrietta Substation that is parallel to 25th Avenue, bisects the Grape Solar Project site and is parallel to the proposed Access Corridor. The resource, a portion of the Camden Jct-Henrietta and Henrietta-Tulare Lake (Line Number 702), is a 31.55 mile long 70 kV line between Camden Jct south to the Henrietta Substation and then south to the Tulare Lake Substation near Kettleman City. The recorded portion of the transmission line runs parallel to 25th Avenue from Kent Avenue south for approximately 1.6 miles, with the recorded portion terminating approximately 3.0 miles north of the northern boundary of the Grape Solar Project site. The unrecorded portion of the transmission line continues through the project site following the unimproved 25th Avenue alignment south to Nevada Avenue. The resource has been evaluated as not eligible for inclusion on the NRHP or CRHR).

No known Hispanic Period or American Period dwellings or other significant structures, features (e.g., adobe dwellings, or other structures, features, etc.) have been identified in or adjacent to the Grape Solar Project site. The field inventories and reviews conducted by Basin Research Associates from 2009 to 2020 found no indications of surface or subsurface significant historic material on or adjacent to the Grape Solar Project site.

No local, state or federal historically or architecturally significant structures, landmarks, or points of interest have been identified within or immediately adjacent to the Grape Solar Project site. No historic properties which have been listed, determined to be eligible or potentially eligible for inclusion on the National Register of Historic Places or the California Register of Historical Resources have been identified in or adjacent to the Grape Solar project site or access corridor.

Environmental Evaluation

a) Would the project cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?

<u>Less-than-Significant Impact with Mitigation Incorporated</u>. The Grape Solar Project site and access corridor include no historic properties determined to be eligible or potentially eligible for inclusion on the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR). According to the cultural resources report prepared by Basin Research Associates, there is a very low to low-moderate potential for the discovery of significant subsurface materials from the historic era within the project site or access corridor, although it is possible that isolated historical materials may be encountered during subsurface excavation.

Construction activity could result in the inadvertent exposure of historical resources that could be eligible for inclusion on the CRHR. This potentially significant project impact to historic resources would be reduced to a *less-than-significant* level through the implementation of Mitigation Measure CR-1 below.

<u>Mitigation Measure CR-1: Protection of Cultural Resources</u>**.** *In order to avoid the potential for impacts to historic and prehistoric archaeological resources, the following measures shall be implemented, as necessary, in conjunction with the construction of each phase of the Grape Solar Project:*

a. <u>Cultural Resources Alert on Project Plans</u>. The project proponent shall note on any plans that require ground disturbing excavation that there is a potential for exposing buried cultural resources.

b. <u>Pre-Construction Briefing</u>. The project proponent shall retain Santa Rosa Rancheria Cultural Staff to provide a pre-construction Cultural Sensitivity Training to construction staff regarding the discovery of cultural resources and the potential for discovery during ground disturbing activities, which will include information on potential cultural material finds and on the procedures to be enacted if resources are found.

c. <u>Stop Work Near any Discovered Cultural Resources</u>. The project proponent shall retain a professional archaeologist on an "on-call" basis during ground disturbing construction for the project to review, identify and evaluate cultural resources that may be inadvertently exposed during construction. Should previously unidentified cultural resources be discovered during construction of the project, the project proponent shall cease work within 100 feet of the resources, and Kings County Community Development Agency (CDA) shall be notified immediately. The archaeologist shall review and evaluate any discoveries to determine if they are historical resource(s) and/or unique archaeological resources under CEQA.

d. <u>Mitigation for Discovered Cultural Resources</u>. If the professional archaeologist determines that any cultural resources exposed during construction constitute a historical resource and/or unique archaeological resource, he/she shall notify the project proponent and other appropriate parties of the evaluation and recommended mitigation measures to mitigate the impact to a less-than-significant level. Mitigation measures may include avoidance, preservation in-place, recordation, additional archaeological testing and data recovery, *among other options. Treatment of any significant cultural resources shall be undertaken with the approval of the Kings County CDA. The archaeologist shall document the resources using DPR 523 forms and file said forms with the California Historical Resources Information System, Southern San Joaquin Valley Information Center. The resources shall be photo-documented and collected by the archaeologist for submittal to the Santa Rosa Rancheria's Cultural and Historical Preservation Department. The archaeologist shall be required to submit to the County for review and approval a report of the findings and method of curation or protection of the resources. Further grading or site work within the area of discovery shall not be allowed until the preceding steps have been taken.*

e. *Native American Monitoring.* *Prior to any ground disturbance, the project proponent shall offer the Santa Rosa Rancheria Tachi Yokut Tribe the opportunity to provide a Native American Monitor during ground disturbing activities during both construction and decommissioning. Tribal participation would be dependent upon the availability and interest of the Tribe.*

f. *Disposition of Cultural Resources.* *Upon coordination with the Kings County Community Development Agency, any pre-historic archaeological artifacts recovered shall be donated to an appropriate Tribal custodian or a qualified scientific institution where they would be afforded applicable cultural resources laws and guidelines.*

b) *Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?*

Less-than-Significant Impact with Mitigation Incorporated. The Grape Solar Project site includes no known prehistoric archaeological resources determined eligible or potentially eligible for inclusion on the National Register of Historic Places or the California Register of Historical Resources.

According to the cultural resources report prepared by Basin Research Associates, there is a very low to low-moderate potential for the discovery of significant subsurface cultural materials within the Grape Solar Project site, although isolated prehistoric finds are possible. Construction operations in areas of native soil could result in the inadvertent exposure of buried prehistoric archaeological materials that could be eligible for inclusion on the CRHR (PRC Section 5024.1) and/or meet the definition of a unique archeological resource as defined in Section 21083.2 of the Public Resources Code (PRC). This potential impact to cultural resources would be reduced to a *less-than-significant* level through the implementation of Mitigation Measure CR-1 above.

c) *Would the project disturb any human remains, including those interred outside of formal cemeteries?*

Less-than-Significant Impact with Mitigation Incorporated. According to the cultural resources report by Basin Research Associates, no human burials have been recorded on the project site or immediate vicinity. The nearest recorded human remains were found at four sites along the former Tulare Lake shoreline, with the nearest recorded burials found 2 miles northeast of the Grape Solar Project site and the remaining three burials located between 4 and 8 miles south . Although considered unlikely, it is possible that human remains could be buried within the Grape Solar project site.

Subsurface excavation for the Grape Solar Project could potentially result in the disturbance of buried human remains. This potential impact would be reduced to *less-than-significant* levels through implementation of Mitigation Measure CR-2 below.

Mitigation Measure CR-2: Protection of Buried Human Remains. *In order to avoid the potential for impacts to buried human remains, the following measures shall be implemented, as necessary, in conjunction with the construction of each phase of the Grape Solar Project:*

a. Pursuant to State Health and Safety Code Section 7050.5(e) and Public Resources Code Section 5097.98, if human bone or bone of unknown origin is found at any time during on- or off-site construction, all work shall stop in the vicinity of the find and the Kings County Coroner shall be notified immediately. If the remains are determined to be Native American, the Coroner shall notify the California State Native American Heritage Commission (NAHC), who shall identify the person believed to be the Most Likely Descendant (MLD. The project proponent and MLD, with the assistance of the archaeologist, shall make all reasonable efforts to develop an agreement for the treatment of human remains and associated or unassociated funerary objects with appropriate dignity (CEQA Guidelines Sec. 15064.5(d)). The agreed upon treatment shall address the appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects. California Public Resources Code allows 48 hours for the MLD to make their wishes known to the landowner after being granted access to the site. If the MLD and the other parties do not agree on the reburial method, the project will follow Public Resources Code Section 5097.98(e) which states that ". . . the landowner or his or her authorized representative shall reinter the human remains and items associated with Native American burials with appropriate dignity on the property in a location not subject to further subsurface disturbance."

b. Any findings shall be submitted by the archaeologist in a professional report submitted to the project applicant, the MLD, the Kings County Community Development Agency, and the California Historical Resources Information System, Southern San Joaquin Valley Information Center.

REFERENCES – CULTURAL RESOURCES

Basin 2021 — Basin Research Associates. 2021. *Cultural Resources Review Report – Grape Solar Project, Kings County, California*. January.
[Cultural Resources report is kept administratively confidential by Kings County Community Development Agency per Government Code Section 6254, subdivision (r) and Section 6452.10.]

4.6. ENERGY

Would the project:		Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant	No Impact
a)	***Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?***	☐	☐	■	☐
b)	***Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?***	☐	☐	☐	■

Setting

In 2003, the three key energy agencies in California – the California Public Utilities Commission (CPUC), the California Energy Commission (CEC), and the California Power Authority (CPA) jointly adopted an "Energy Action Plan" (EAP) that established goals for California's energy future and set forth a commitment to achieve these goals through specific actions. Updated in 2005 and 2008, the Plan identifies priorities for meeting the State's energy needs, including energy efficiency and greater reliance on renewable sources of power.

Energy consumption is closely related to greenhouse gas emissions, so reductions in GHG emissions also reduce overall energy consumption, particularly from non-renewable sources. In an effort to avert the consequences of climate change, the California State Legislature enacted the California Global Warming Solutions Act (AB 32) in 2006. AB 32 established a state goal of reducing GHG emissions to 1990 levels by 2020 (a reduction of approximately 25 percent from forecast emissions levels), and required the California Air Resources Board (CARB) to establish a comprehensive program to implement this goal. In 2016, the legislature passed SB 32 which extended the goals of AB 32 and set a 2030 goal of reducing 2030 emissions by 40 percent from 2020 levels.

One of the key implementation programs is the Renewables Portfolio Standard (RPS) which mandates that renewable generation sources comprise at least 33 percent of electrical utilities' total power generation by 2020. Qualifying renewable generation sources include solar, wind, small hydro, geothermal, and biomass. In September 2018, Governor Brown signed SB 100, which updated the required renewables content of electricity generation to 50 percent by 2025 and 60 percent by 2030, and puts California on the path to implement a zero-carbon electricity grid by 2045.

As of 2019, renewable energy sources, including biomass, geothermal, small-scale hydro, solar, and wind, accounted for an estimated 36 percent of California's power mix, with utility-scale solar generation accounting for 12.6 percent of the State's power mix (CEC 2020b, pp. 2, 5). In 2019, PG&E's power mix included 29.7 percent from renewable sources, with solar accounting for 12.7 percent of the total (PG&E 2020, p. 40).

Environmental Evaluation

a) *Would the project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?*

Less-than-Significant Impact. The following is a discussion of the potential impacts related to energy consumption in the construction and operational phases of the Grape Solar Project.

Construction

The construction of the Grape Solar Project would involve the short-term consumption of electricity for operation of tools, machinery, and lighting, and consumption of fuels for construction equipment, material truck deliveries, and vehicle trips generated by construction workers traveling to and from the project site. Energy would also be used in the manufacture of the solar modules and associated equipment, although the solar modules and other array components would be recyclable. As required by the CALGreen Code, 65 percent of construction and demolition waste would be diverted from the waste stream, allowing for reuse of these materials and thus saving energy that would otherwise be consumed in extraction, transport and processing of virgin materials (CSBC 2019).

The primary form of energy used during construction is petroleum-based fuels, primarily diesel. Natural gas is not used during construction-related activities, and the relatively small amounts of electricity used for power tools and lighting in building construction would not result in wasteful or unnecessary electricity demands. Fuel consumption by equipment during construction-related activities was estimated using construction CO_2 emissions calculated from CalEEMod outputs from the air quality analysis and converted to diesel. The results are shown in Table 9.

TABLE 9

GRAPE SOLAR PROJECT – ENERGY CONSUMPTION AND PRODUCTION

Project Phase	Consumption			Production		Consumption as % of Annual Production
	MT CO_2e	Fuel Equivalent[1] (gallons)	MBtu Equivalent[2]	MWh/yr	MBtu Equivalent[3]	
Construction (total)	7,098	6,986,561	959,953	618,000[4]	2,108,616	45.5%
Operation (annual)	125	123,038	16,905			0.8%
Operation (25 years)	3,125	3,075,938	442,634			21.0%
Decommissioning (total)	7,098	6,986,561	959,953			45.5%
Project Lifetime (construction, operation, decommissioning)	17,321	17,049,060	2,342,541	15,450,000	52,715,400	4.4%

Conversion Factors
1. GHG to Fuel: 10.16 $kgCO_2e$/gal diesel = 0.9843 gal/$kgCO_2e$ X 1,000 kg/MT = 984.3 gal/MT CO_2e
2. Fuel to Energy: 137,381 Btu/gal / 1,000 Btu/MBtu = 0.1374 MBtu/gal
3. Energy to Electricity: 3,412 Btu/kWh / 1,000 Btu/MWh / 1,000,000 Btu/MBtu = 3.412 MBtu/MWh
4. Based on Kings County 2017 average annual generation for PV facilities of 2,473 MWh/MW/yr (CEC 2019).

Sources: Illingworth & Rodkin 2021; EIA 2016; EIA 2020.

As shown in Table 9, the total fuel consumption during all phases of on-site and off-site vehicle and equipment usage during construction for the Grape Solar Project is estimated to be approximately 7.0 million gallons; primarily diesel fuel. [Gasoline will likely comprise a minor portion of the overall fuel consumption, mainly for use in passenger vehicles by commuting construction workers. Although it is unknown exactly how much gasoline would consumed relative to diesel fuel, it is known that gasoline is about 14 percent less carbon-intensive than diesel fuel (i.e., one gallon of diesel emits as much GHG as 1.14 gallons of gasoline)(US EIA 2016). Therefore, the above fuel consumption estimate for project construction represents the worst case.]

The construction fuel consumption total was converted to British Thermal Units (Btu) to allow comparison with project solar energy production, which was converted from MWh/yr to Btus. As shown in Table 9, the total energy consumed in project construction is equivalent to about 46 percent of one year's electricity production at the Grape Solar Project. As also shown, the total lifetime energy use of the Grape Solar Project (including construction, decommissioning, and 25 years of operation) is approximately 4.4 percent of total energy production over the project's useful life. Thus the overall energy efficiency of the Grape Solar Project would be approximately 95.6 percent over the project's lifetime. By comparison, the energy efficiency of the most efficient combined-cycle natural gas fueled power plant in California is approximately 47 percent, which means that 53 percent of the energy input in the form of natural gas is wasted during electricity generation (CEC 2020c, p. 10). However, the 47 percent energy efficiency for natural gas plants does not take into account the energy consumed in plant construction or decommissioning. If energy inputs for construction and decommissioning of the solar facility are ignored to allow for a valid comparison, the 0.8 percent annual energy input vs. output for the solar facility would be 66 times more energy efficient than the most efficient natural gas-fueled power plant with energy input vs. output of 53 percent.

Additionally, the efficiency of fuel use during construction the Grape Solar Project would be increased through implementation of the San Joaquin Valley Air Pollution Control District's requirement for clean fleet construction equipment to minimize emissions under Rule 9510 (ISR) which would also indirectly result in greater fuel efficiency. Unnecessary idling of construction equipment and vehicles would be avoided through compliance with California Code of Regulations (CCR) Section 2485, which requires that non-essential idling for all diesel-fueled vehicles not exceed 5 minutes at any given location. The energy efficiency of fuel consumed by commuting workers and delivery vehicles would be ensured through federal fuel efficiency standards. For construction haul trucks, the State's regulation to reduce diesel emissions through replacement of older trucks with newer models with diesel emissions controls would also result in greater fuel efficiency for long-haul trucks. In addition, the project would be constructed in accordance with the California Building Standards Code and Energy Efficiency Standards, as enforced through plan review and site inspections by the County Building Official. Given that the project would comply with the above rules, regulations, and programs to maximize energy efficiency in vehicles and equipment used in construction, it is concluded that project construction would not result in the inefficient, wasteful, or unnecessary use of energy resources.

<u>Operation</u>

The Grape Solar Project would be operationally non-intensive since it would be operated remotely and would require occasional visits by operations personnel for inspections, maintenance and repair activities. Thus the project would involve relatively small amounts of fuel consumption for staff travel to and from the site, and for fueling maintenance vehicles and equipment. Electricity consumption for project lighting and operation would also be light.

The primary purpose of the Grape Solar Project is to generate renewable solar energy in order to provide for the reduced statewide reliance on non-renewable fossil fueled generation. The operation of the solar facility would allow for the decommissioning of equivalent generation from a natural gas fired power plant. As shown in Table 9, the annual energy consumed for project operation would be equivalent to approximately 0.8 percent of annual energy production at the Grape Solar Project. In other words, the operating energy efficiency of the solar facility would be about 99.2 percent, which is extremely efficient compared to fossil-fueled power plants, of which even the most efficient plants achieve an energy efficiency of 47 percent, or 66 times less efficient than solar. Thus the project consumption of energy would not be wasteful or inefficient, and the project would result in a substantial offset of non-renewable fossil fuel generation with renewable solar generation. Therefore, the Grape Solar Project would not result in wasteful, inefficient, or unnecessary use of energy, and the impact to energy resources would be *less than significant*.

b) Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

No Impact. At the local level, there are several policies contained in the *2035 Kings County General Plan* which directly address renewable energy or energy efficiency. In the Resource Conservation Element, RC Policies G1.2.1 through G1.2.6 promote the use of renewable energy sources such as solar, wind, and biomass projects, and provide guidance for their appropriate placement and project review. RC Policies G1.3.1 through G1.3.4 address energy conservation and project design measures for reducing energy demand (Kings County 2010b). The Grape Solar Project would advance the implementation of these policies by providing a new source of renewable energy.

At the State level, there are numerous plans, policies, and regulations that directly and indirectly address renewable energy and energy efficiency. For energy efficiency in building construction, the applicable energy conservation requirements are contained in the California Building Standards Code and Energy Efficiency Standards, which have been incorporated into the Kings County Building Code. The Grape Solar Project would incorporate the applicable energy efficiency standards in its construction, as enforced by the County Building Official.

The State's primary mandate for renewable energy is embodied by AB 32 – The California Global Warming Solutions Act, which is implemented through its Scoping Plan. The 2017 Climate Change Scoping Plan adopted by the California Air Resources Board outlines the strategies for achieving the emissions reduction target mandated in AB 32. One of the key strategies is the Renewables Portfolio Standard (RPS), which now requires all electric utilities in California to include a minimum of 60 percent renewable generation sources in their overall energy mix by 2030, and establishes a target of 100 percent renewables by 2045. As a solar photovoltaic generating facility, the Grape Solar Project will help increase the proportion of renewables in the statewide energy portfolio, thereby furthering the implementation of RPS by the target years instead of obstructing its implementation. The addition of the project's solar generation to the state's electrical supply will help facilitate the retirement of existing older fossil-fueled generation plants, thereby avoiding or offsetting those sources of GHG emissions. Therefore, the Grape Solar Project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency, thus would have *no impact* in this regard.

REFERENCES – ENERGY

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CEC 2019	California Energy Commission (CEC). 2019. *California Solar Energy Statistics & Data*. https://www.energy.ca.gov/almanac/renewables_data/solar/
CEC 2020a	California Energy Commission (CEC). 2020. *Final 2019 Integrated Energy Policy Report*. February. https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2019-integrated-energy-policy-report
CEC 2020b	California Energy Commission (CEC). 2020. *Tracking Progress – Renewable Energy*. February. https://www.energy.ca.gov/sites/default/files/2019-12/renewable_ada.pdf
CEC 2020c	California Energy Commission (CEC). 2020. *Thermal Efficiency of Natural Gas-Fired Generation in California: 2019 Update*. June. https://www.energy.ca.gov/data-reports/energy-almanac/californias-natural-gas-market/thermal-efficiency-natural-gas-fired
CBSC 2019	California Building Standards Commission (CBSC). 2019. *2019 California Green Building Standards Code ("CALGreen Code")*. California Code of Regulations, Title 24, Part 11. Published July 2019. Effective January 1, 2020. https://calgreenenergyservices.com/wp/wp-content/uploads/2019_california_green_code.pdf
Kings County 2010b	Kings County. 2010. *2035 Kings County General Plan – Resource Conservation Element*. Adopted January 26, 2010. http://www.countyofkings.com/home/showdocument?id=3112
I&R 2021	Illingworth & Rodkin (I&R). 2021. *Grape Solar Project – Air Quality Assessment*. February. [Contained in Appendix A of this document.]
PG&E 2020	PG&E Corporation (PG&E). 2020. Corporate Responsibility Report – 2020. https://www.pgecorp.com/corp_responsibility/reports/2020/assets/PGE_CRSR_2020.pdf

US EIA 2016 — US Energy Information Administration (US EIA). 2016. *Carbon Dioxide Emissions Coefficients*. February. https://www.eia.gov/environment/emissions/co2_vol_mass.php

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4.7. GEOLOGY AND SOILS

Would the project:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant	No Impact
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	■
ii) Strong seismic ground shaking?	☐	☐	■	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	■	☐
iv) Landslides?	☐	☐	☐	■
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	■	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	■	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating direct or indirect risks to life or property?	☐	■	☐	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	■	☐
f) Directly or indirectly destroy a unique paleontological resource or site of unique geologic feature?	☐	■	☐	☐

Geologic Setting

Site Geology

The Grape Solar Project site is located in the Great Valley Geomorphic Province, a topographic and structural basin bounded on the east by the Sierra Nevada and on the west by the Coast Ranges. The Sierra Nevada are part of a fault block which dips gently to the southwest which forms the bedrock beneath the valley. This basement complex is composed of igneous and metamorphic rocks of pre-Tertiary age. These are in turn overlain by Quaternary period alluvium, including material from the Pleistocene Epoch (about 2.6 Million to about 11,700 years ago), which is covered by layer of Holocene Epoch (about 11,700 years ago to present) material of varying thickness.

Tectonics and Seismicity

There are no Alquist-Priolo Earthquake Fault Zones mapped in the vicinity of the Grape Solar Project site (CGS 2014b). However, there are several active faults in the Diablo Range to the west, including the San Andreas Fault Zone, the Nunez Fault Zone, and the Great Valley Fault System. (An “active fault” is defined as a fault that has had surface displacement within the Holocene age, i.e., within the last 11,700 years.)

The nearest segment of the San Andreas fault is located about 35 miles southwest of the project site and it is estimated to be capable of producing a magnitude 7.7 earthquake along the nearest segments to the project area. The Great Valley Fault System, which runs parallel to and east of the San Andreas Fault Zone, is composed of blind thrust faults, which do not intersect the ground surface but can cause significant shaking and ground deformation.

The most recent large earthquake near Kings County was the Kettleman Hills earthquake of magnitude 6.1 in August 1985, whose epicenter was located four miles from the Kings County border just north of Avenal. It was preceded by the 1982 New Idria earthquake (M 5.4), approximately 35 miles west/northwest of the project site, and the May 1983 Coalinga earthquake (M 6.5). The Coalinga earthquake occurred in Nunez Fault Zone, a 3-mile long fault zone located 2 miles northwest of Coalinga. The Nunez fault is a designated Alquist-Priolo Earthquake Fault Zone and is located about 27 miles west of the project site at its nearest point. All three of these earthquakes produced low level ground shaking and low local magnitude in Kings County (Kings County 2010e; Kings County OES 2012).

Geomorphology and Soils

The parent materials of the soils in the project area originate from marine sediments of the Coast Ranges formed millions of years ago when these lands were on the seabed. These formations, which primarily consist of fine-grained shales, were uplifted over time, and were then subject to erosional forces which transported these sediments downstream to the west side of the San Joaquin Valley where they formed large alluvial fans. These geomorphological processes resulted in the formation of two distinct landform types in the western San Joaquin Valley, including: 1) the upper and middle alluvial fans and fan terrace areas in the higher westerly elevations; and 2) the lower alluvial fans or fan skirts, interfan areas, and basin floors located in the lower lying eastern areas. The project site is located on the lower alluvial fan area which is characterized by fine-textured clayey soils with low permeability and slow groundwater movement. The upper clay layers combined with the slow draining soils result in a high or "perched" groundwater table that is typically within 10 to 15 feet of the ground surface throughout the project site (WWD 2017a, 2017b).

NRCS Soil Survey

The most recent comprehensive soil survey of Kings County was completed in 1985 by the National Resources Conservation Service (NRCS), formerly the Soil Conservation Service (SCS). According to the Kings County Soil Survey, the soils on the Grape Solar Project site consist largely of Lethent clay loam (64%), with a moderate-sized area of Twisselman silty clay, saline-alkali (17%) in the northwest corner, and small areas of Houser clay, partially drained (10%) and Westcamp loam (9%) in the eastern portion of the project site. All of the soils on the project site have very similar characteristics and are described as saline-alkali soils, with very low permeability, slow runoff, low erosion hazard, and high shrink-swell (expansion) potential. The saline-alkali condition of the soils causes high corrosivity to steel and concrete (NRCS 1986).

[Note: A detailed description of geological and soils conditions and corresponding regulatory context applicable to the Grape Solar Project is contained in the Draft Program EIR on the Westlands Solar Park Master Plan and Gen-Tie Corridors Plan, which is incorporated into this document by reference pursuant to Section 15150 of the State CEQA Guidelines (WWD 2017c).]

Paleontological Resources

Paleontological resources comprise fossils – the remains or traces of once-living organisms preserved in sedimentary deposits – together with the geologic context in which they occur. Fossils are scientifically important as they provide the only available direct evidence of the anatomy, geographic distribution, and paleoecology of organisms of the past. Significant paleontological resources may include vertebrate fossils and their associated taphonomic (fossilization) and environmental indicators; invertebrate fossils; and/or plant fossils. It is noted that no vertebrate fossil localities have been recorded on the Grape Solar Project site or in the vicinity (Paleo Solutions 2020).

The surface soils of the Grape Solar Project site are underlain by alluvium deposited during the Quaternary period (approximately 2.6 million years to present). Quaternary alluvium is further divided into a number of subunits, including the following units which occur on the project site: Quaternary basin deposits (Qb), consisting of materials deposited by Kings River flows and overbank flood events, which comprise the majority of the surface materials on the project site; and Quaternary lake deposits (Ql), consisting of materials deposited on the lakebed of former Tulare Lake to the east and southeast including the eastern edge of the project site (CGS 1965). Quaternary lake deposits, which cover the eastern 25 percent of the site, are considered to have a moderate potential to yield paleontological resources, while Quaternary basin deposits, which comprise the western 75 percent of the site, have a low potential to yield fossils (Paleo Solutions 2020).

On a temporal scale, the Quaternary period is divided into two epochs or ages, including the Pleistocene Epoch (about 2.6 million to 11.7 thousand years ago) and the more recent Holocene Epoch (about 11,700 years ago to present). The Pleistocene Epoch is informally termed the Ice Age, and this is the depositional period which yields vertebrate fossils. The Holocene deposits, which comprise more recent layers that were deposited on top of the Pleistocene material, yield few if any vertebrate fossils and thus have a low paleontological sensitivity. However, the thickness of the Holocene layer covering the paleontologically sensitive Pleistocene (or older Quaternary) alluvium is highly variable, so the depth at which the older Quaternary alluvium occurs at a given location is uncertain.

The Quaternary lake deposits (Ql) are classified as Holocene-to-Pleistocene-age deposits where Ice Age fossils have been recovered from the Tulare Lake deposits in Kings County. The specimens include: western pond turtle, horse, bison, elephant, ground sloth and mammoth. Additionally, numerous fossils have been documented from Pleistocene-age deposits in Fresno, Tulare and Kern counties. Within the areas with Quaternary basin deposits (Qb), the Holocene materials at the surface are typically too young to contain fossilized material. Within the Qb deposits, the more sensitive Pliestocene material is typically several feet or more below the surface which is the reason the Qb deposits have a low potential to yield paleontological resources. It is considered highly unlikely that fossils are present within Qb deposits at depths shallower than 5 feet below the ground surface (Paleo Solutions 2020).

Environmental Evaluation

a) Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42?

No Impact. The Grape Solar Project site is not included in an earthquake fault zone designated by the California Geological Survey pursuant to the Alquist-Priolo Act. In addition, the Health and Safety Element of the 2035 Kings County General Plan states" "[t]he County has no known major fault systems within its territory" (Kings County 2010e). Since there are no known earthquake faults on or near the project site, there are *no impacts* associated with the Grape Solar Project relative to surface rupture of an earthquake fault.

ii) Strong seismic ground shaking?

Less-than-Significant Impact. The project area is located in one of the more seismically active areas of California, with several major faults within a 50-mile radius capable of generating maximum credible earthquakes with magnitudes of 6.5 or greater. Within the Grape Solar Project site, the intensity of ground shaking (or Peak Ground Acceleration – PGA) during an earthquake is estimated to be 0.541g (g = force of gravity)(CGS 2008). This represents the intensity of ground motion with a 2 percent chance of being exceeded in 50 years, or the intensity of ground shaking anticipated once in 2,500 years (CGS 2016). This level of ground acceleration is perceived as severe shaking and is associated with moderate to heavy damage potential.

Groundshaking resulting from a large or moderate earthquake centered on faults in the western foothills would cause dynamic loading resulting in stress to structures at the project site. However, structures designed and built in accordance with the California Building Code are expected to respond well. The CBC structural design standards provide for high degree of seismic strength and resistance to lateral forces (strong shaking) in order to minimize risks to public safety and damage to property. The California Building Code has been adopted as the Kings County Building Code, which is implemented and enforced by the Kings County Building Official and Building Inspectors through building permit reviews, approvals, inspections, and final sign offs.

The following passage from page 8 of the "Health and Safety Element" of the *2035 Kings County General Plan* is relevant to this discussion:

> "Damage and injury resulting from geologic hazards can be reduced to acceptable levels through zoning and building permit review procedures and construction standards. New construction conforming to the standards of the California Building Code (CBC) will provide adequate protection."

In summary, the potentially significant impacts due to groundshaking at the Grape Solar Project site would be reduced to *less-than-significant* levels through implementation of the applicable seismic design standards of the California Building Code, as enforced by the Kings County Building Division.

iii) Seismic-related ground failure, including liquefaction?

Less-than-Significant Impact. Seismic ground failures can include liquefaction and seismically-induced differential settlement, as discussed below.

Soil liquefaction is the phenomenon in which a saturated, cohesionless soil loses structural strength during an earthquake as a result of induced shearing strains, which essentially transforms the soil to a liquid state resulting in ground failure or surface deformation. Liquefaction can result in total and differential settlement of structures. Conditions required for liquefaction typically include fine, well-sorted, loose sandy soil, high groundwater, higher intensity earthquakes, and particularly long duration of ground shaking.

No regulatory mapping of liquefaction zones has been prepared by the California Geological Survey for the project area, with the nearest such mapping completed for Santa Clara County (CGS 2014). All of the soils that cover the project site have high clay content, indicating a low susceptibility to liquefaction. The nearest groundwater within the project site was most recently (April 2017) mapped at 10 to 15 feet below the ground surface (WWD 2017b). Given the clayey soils of the project site, the relatively high groundwater conditions would not be sufficient to induce liquefaction during a seismic event.

In addition, the "Health and Safety Element" of the *2035 Kings County General Plan*, it states "[t]he risk and danger of liquefaction and subsidence occurring within the County is considered to be minimal" (Kings County 2010e). The potential impacts to the Grape Solar Project due to liquefaction would be *less than significant*.

Seismic settlement can occur when saturated and unsaturated granular soils become rearranged during groundshaking resulting in a volume reduction and surface deformation. The magnitude of seismic settlement is a function of the relative density of the soil and the magnitude of cyclic shear stress caused by seismic ground motion. Seismic settlement has the greatest potential to occur in locations where loose granular materials such as sandy soils are present above the groundwater table. The relatively dense clay soils that cover the project site are associated with a low potential for surface deformation resulting from seismic settlement. However, the potential for seismic settlement would be addressed through geotechnical studies which would identify soil engineering specifications to ensure that foundations and footings would be designed meet applicable standards to prevent settlements. As such, the potential impacts to the Grape Solar Project due to seismic settlement would be *less than significant*.

iv) Landslides?

No Impact. No regulatory mapping of landslide zones has been prepared by the California Geological Survey for the project area, with the nearest such mapping completed for Santa Clara County (CGS 2014a). The project area is not mapped as lying within a landslide hazard area by USGS landslide mapping which shows the nearest landslide areas in the foothills of the Diablo Range to the west (USGS 1997). In addition, the "Health and Safety Element" of the *2035 Kings County General*

Plan indicates that project area is defined has having a "low" susceptibility to landslides (Kings County 2010e). The nearly level terrain of project area has a very low potential for landslides. As such, the Grape Solar Project is associated with *no impact* relative to landslides.

b) Would the project result in substantial soil erosion or the loss of topsoil?

Less-than-Significant Impact. All of the soils on the project site have slow runoff potential with a correspondingly low hazard of water erosion (NRCS 1986). However, the seasonal high wind conditions (typically from March to June) results in high potential for wind erosion within the project area (Kings County 2010b).

Grading, excavation, vegetation removal, and ground disturbance during construction would expose the soil to potential erosion from wind and rain. As described in Section *2.2. Project Description*, existing vegetation within a given area of the project would only be removed when that area is scheduled for installation of solar arrays. Existing topsoil would not be removed, and once the installation of solar arrays in a given area is complete, the affected area would be revegetated with a native seed mix. In order to prevent erosion caused by stormwater runoff, soil stabilization and erosion control measures would be employed during grading and construction of each increment of solar development, as specified in Mitigation Measure HYD-1 (see Section *4.10. Hydrology and Water Quality,* item 'c').

The specific erosion controls to be implemented at the project site will be specified in the Storm Water Pollution Prevention Plan (SWPPP), as required for all projects over 1 acre in size by the State Water Resources Control Board's Construction Stormwater General Permit. The SWPPP for the project will specify Best Management Practices (BMPs) such as stormwater runoff control and hazardous waste management measures, and will include monitoring and reporting procedures.

Typical erosion control measures may include: scheduling construction activities to avoid forecasted rain events and implementing soil stabilization measures prior to rain events; designating restricted entry zones; sediment tracking control measures such as crushed stone or riffle metal plates at construction entrances; and soil stabilization such as mulching or revegetation once activities in an area are complete or suspended. Specific BMPs for the Grape Solar Project will be determined during the final engineering design stages for the project. The project SWPPP will be prepared by a certified Qualified SWPPP Developer (QSD), who will ensure that the BMPs in the project-specific SWPPP will fully comply with the requirements of the General Permit. Regional Board staff is responsible for inspections of construction sites to ensure the effectiveness of BMPs specified in the SWPPP.

With the implementation of the measures specified in the SWPPP, the potential for the Grape Solar Project to result in erosion impacts would be reduced to *less-than-significant* levels.

[Note: The potential erosion and siltation impacts are discussed in greater detail in section *4.10. Hydrology and Water Quality*.]

c) Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

<u>Less-than-Significant Impact</u>. As discussed above, the project site is not susceptible to landslides, liquefaction, or seismic settlement. The potential for lateral spreading and land subsidence is discussed below.

<u>Lateral spreading</u> (or liquefaction-induced lateral spreading) can occur with seismic ground shaking on slopes where saturated soils liquefy and flow toward the open slope face. The project site is relatively flat and does not include significant slopes with the exception of the channel banks of the irrigation canals that run through and alongside the project site. These channels are periodically dredged cleared of vegetation to maintain their hydraulic capacity, resulting in exposed earth channel faces with about 2:1 slopes. However, the clay soils of the project area are not susceptible to liquefaction, so the similarly stiff clay soils along the open slope faces of the irrigation canals would likewise not be subject to lateral spreading resulting from liquefied soils. In summary, the potential impact from lateral spreading on or near the Grape Solar Project site would be *less than significant*.

<u>Ground subsidence</u> is typically caused when overdrafts of a groundwater basin reduces the upward hydraulic pressure that supports the overlying land surface, resulting in consolidation/settlement of the underlying soils. Subsidence has the potential to damage local, state, and federal infrastructure, including reducing the freeboard and flow capacity of the California Aqueduct and irrigation delivery canals and pipelines, as well as causing structural damage to bridges, roads, flood control facilities and other structures. Large areas of the San Joaquin Valley, including the project area, have been subject to subsidence from groundwater use for many of years. Mapping by the U.S. Bureau of Reclamation shows that from the years 1926 to 1970, the land at the project site subsided by more than 10 feet (USBR 2011). From 2007 to 2011, the land at the site subsided between 0.5 and 1.0 feet (CWF 2014). As discussed in Section *4.10. Hydrology and Water Quality*, groundwater pumping in the area can exceed the safe yield of the groundwater basin during drought years when severe curtailment in surface water deliveries from the Central Valley Project necessitates increased pumping of groundwater to make up for reductions in imported supplies. The overpumping of groundwater and resulting subsidence is the cumulative result of water withdrawals from many agricultural wells. As discussed in Section *4.10. Hydrology and Water Quality*, the Grape Solar Project would use a small fraction of the groundwater that is typically used for agricultural irrigation over an equivalent area of farmland. Therefore, the project would have a beneficial impact in that it would help alleviate the ongoing cumulative subsidence impacts by causing a reduction in overall groundwater use in the valley. Therefore, the Grape Solar Project would have *no adverse impact* in terms of land subsidence.

d) Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

<u>Less-than-Significant Impact with Mitigation Incorporated</u>. Expansive soils are typically associated with fine-grained clayey soils that have the potential to shrink and swell during seasonal wetting and drying cycles. The ability of clayey soil to change volume with variations in moisture content can result in uplift or cracking of foundation elements or other rigid structures such as slabs-on-grade, rigid pavements, or other slabs or hardscape founded on these soils. All of the soils covering the Grape Solar Project site have a high shrink-swell potential (NRCS 1986). Figure HS-4 of the *2035 Kings County General Plan* "Health and Safety Element" also identifies the project site as having expansive soils (Kings County 2010e). As such, there is a potential for damage to project pads and foundations as a result of soils expansion beneath these structures. In order to reduce the potential impacts from soils expansion to less-than-significant levels, the following mitigation measure would be implemented in conjunction with the Grape Solar Project.

> ***Mitigation Measure GEO-1: Expansive Soils within Grape Solar Project Site.*** *Prior to the issuance of the first building permit for each phase of the Grape Solar Project, the applicant shall retain a qualified registered civil engineer to prepare a preliminary soils report, based on soil borings or excavations, to determine the potential for soils expansion and to prepare recommendations for corrective actions to mitigate potential damage to project structures due to potential soils expansion. The preliminary soils report shall be submitted to Kings County Community Development Agency Building Division for review and approval. The potential damage from soils expansion can be reduced by one or more of several alternative engineering measures, as recommended by the registered civil engineer. These measures could include: overexcavation and replacement with non-expansive soils; extending foundations below the zone of shrink and swell; chemically treating the soils with quicklime or cement; or foundation design measures. The corrective measures specified would become conditions of Building Permit approval and would be subject to inspection and approval by the Kings County Building Official.*

Although the entire project site is mapped as being underlain with expansive soils, there is potential for variability of expansiveness of the soils depending on location within the site. In addition, the project facilities that would be most subject to damage from soils expansion would be equipment pads and foundations. Since the precise locations of the equipment pads will not be determined until the final engineering design stage, the soil borings and/or excavations required to determine the soils expansion characteristics at those sites, as well as the recommendations for appropriate corrective actions to be undertaken at those sites, must be made in conjunction with the final engineering design for the project. The final engineering design for the project will take place after approval of the Conditional Use Permit and prior to issuance of the Building Permits for the project. With the implementation of Mitigation Measure GEO-1, the potential risks to life or property at the Grape Solar Project due to potential soils expansion would be *less than significant*.

e) Would the project have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

Less-than-Significant Impact. The Grape Solar Project will utilize an on-site septic tank and leachfield system for disposal of wastewater associated with the Operations and Maintenance (O&M) building. The general requirements for septic leachfield design are set forth on the County's "Septic Tank Absorption Map," which classifies the County soils into four broad categories and indicates general specifications for the number of square feet of leaching area required for each 100 gallons of septic tank capacity for each soil category. Most of the Grape Solar Project site is mapped as Soil Type "B" which requires 60 square feet of leaching area for each 100 gallons of septic tank capacity. However, there is an area of approximately 100 acres in the northeast corner of the project site where the County mapping indicates that an engineered septic system would be required due to the presence of perched groundwater conditions (Kings County 2001). The project O&M building, and associated septic and leachfield system, are planned to be located just northeast of the intersection of Nevada Avenue and the 25th Avenue alignment, a location which is well within the Soil Type "B" area and at least one mile southwest of the area where engineering would be required for the on-site septic system. As such, soils in the planned leachfield area would be capable of adequately supporting the use of a septic tank for the project. Therefore, Grape Solar Project would result in *a less-than-significant impact* in terms of capability of the site soils to adequately support septic systems.

f) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Less-than-Significant Impact with Mitigation Incorporated. As discussed in the Setting section above, no vertebrate fossil localities have been recorded on the Grape Solar Project site or in the vicinity. However, the eastern portions of the project site, which are characterized by Quaternary lake deposits (Ql) associated with the Tulare Lakebed, have a moderate potential for yielding paleontological resources from the Holocene-Pleistocene age deposits. Therefore, there is a potential for grading and excavation activities in the eastern portion of the project, which comprises approximately 25 percent of the site area, to disturb or destroy important fossils. The potential impact to paleontological resources in the eastern portions of the project site would be reduced to a *less-than-significant* level through implementation of Mitigation Measure GEO-2 below.

In the central and western portions of the project site, the Quaternary basin deposits (Qb) have a surface layer of Holocene-era material which has a low potential for paleontological resources because it is typically too young to contain fossils. The Holocene material is underlain with Pleistocene-era deposits at depth, and this buried material has the potential for yielding fossils. Thus there is a very low potential for paleontological resources to be encountered within the recent alluvium that characterizes the surface material in the central and western portions of the Grape Solar Project site, because these sediments are too recent to preserve significant fossils. There is a greater potential for paleontological resources to be encountered in the older alluvium that underlies the surface alluvium at depth, although the precise depth to older Pleistocene-era alluvium in the project area is unknown. Thus surface grading and excavations within the areas of Qb deposits are unlikely to uncover significant fossil vertebrate remains. However, there is a potential for encountering fossils if excavations penetrate below 5 feet within the area of Qb deposits. Most excavations for the Grape Solar Project will involve trenching for electrical cable which would involve excavations to a depth of 3 or 4 feet; however, deeper utility lines may require excavations to depths lower than 5 feet, which could potentially disturb or destroy important fossils within the central and western portions of the project site. The potential impact to paleontological resources would be reduced to a *less-than-significant* level through implementation of Mitigation Measure GEO-2 below.

There are no unique geologic features which could be adversely affected by the Grape Solar Project.

Mitigation Measure GEO-2: Protection of Paleontological Resources. *In order to avoid the potential for impacts to paleontological resources, the following measures shall be implemented, as necessary, in conjunction with the construction of the Grape Solar Project:*

a. *Preparation of PRMMP. Prior to commencement of any grading on the site, a professional paleontologist shall be retained to prepare a Paleontological Resource Monitoring and Mitigation Plan (PRMMP). The PRMMP shall include: detailed recommendations on monitoring locations; a description of a worker training program; detailed procedures for monitoring, fossil recovery, laboratory analysis, and museum curation; and notification procedures in the event of a fossil discovery by a paleontological monitor or other project personnel. A curation agreement with the Natural History Museum of Los Angeles County (LACM) or another accredited repository should be obtained at this stage.*

b. *Monitoring for Fossils. Since the project site includes two distinct geological surface deposits with different levels of sensitivity for paleontological resources, the monitoring program provides for different monitoring procedures for each, as follows:*

   Eastern Portion of Project Site. The eastern 25 percent of the site area is mapped as composed of Pleistocene-age Tulare Lake Bed (Ql) deposits which have a moderate potential to yield paleontological resources. Within this area, grading and excavation shall be monitored by a professional paleontologist for an initial period to obtain a ground-level understanding of paleontological conditions within this area. If the deposits mapped in this area are found by the paleontological monitor to be not conducive to fossil preservation, the monitoring program in this area should be reduced or suspended as recommended by the paleontologist and as agreed to by the Kings County Community Development Agency (CDA).

   Central and Western Portions of the Site. The central and western 75 percent of the site area is mapped as composed of younger Holocene basin deposits (Qb) which have a low potential to yield paleontological resources at the surface, but which is underlain by older Pleistocene-age deposits, located at varying depths but typically at least five feet below ground surface, which have a moderate potential to yield paleontological resources. Within these areas of the project site, excavations to depths of five feet or deeper shall be initially spot checked to determine whether project excavations will disturb paleontologically sensitive older alluvial deposits where scientifically significant fossils may be present. In the event that paleontologically sensitive sediments are observed, full time monitoring shall be initially implemented for excavations which extend to the depth of the older alluvial deposits. If it is determined that only sediments that are not conducive to fossil preservation are disturbed by excavation, the monitoring program should be reduced or suspended as recommended by the paleontologist and as agreed to by the Kings County CDA.

c. *Work Stoppage upon Discovery of Fossils. If any subsurface bones or potential fossils are unearthed during grading, excavation, and construction activities at the project site, all work within 100 feet of the find shall cease, and work within this exclusion zone shall not recommence until the applicable provisions of the PRMMP have been implemented, specifically not until the paleontologist has completed a professional evaluation of the resources and made recommendations regarding the treatment, recovery, and curation of the resources, as appropriate, and not until the recommendations for removal and stabilization of the resources have been implemented. Treatment of any significant paleontological resources shall be undertaken with the approval of the Kings County CDA.*

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4.8. GREENHOUSE GAS

Would the project:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant effect on the environment?	☐	☐	■	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☐	■

Setting

The accumulation of greenhouses gases (GHGs) in the atmosphere has been determined to be a causative factor in climate change. Greenhouse gases trap heat in the atmosphere, which in turn heats the surface of the earth. The increase in the average temperature of the atmosphere near the earth's surface is associated with significant changes in global climate patterns. Potential impacts of global warming include a rising sea levels, reductions in Sierra snowpack, increase in extreme weather events, increased risk of large wildfires, and adverse changes to marine and terrestrial ecosystems.

Some GHGs are naturally occurring and are emitted through natural processes, while others are emitted solely from human activities. The predominant source of non-natural GHG emissions is the use of fossil fuels which produces carbon dioxide (CO_2) as a byproduct of combustion. Other GHGs include methane (CH_4), nitrous oxide (N_2O), hydroflourocarbons, perfluorocarbons, and sulfur hexafluoride.

In an effort to avert the consequences of climate change, the California State Legislature enacted the California Global Warming Solutions Act (AB 32) in 2006. AB 32 established a state goal of reducing GHG emissions to 1990 levels by 2020 (a reduction of approximately 25 percent from forecast emissions levels), and required the California Air Resources Board (CARB) to establish a comprehensive program to implement this goal. In 2016, the legislature passed SB 32 which extended the goals of AB 32 and set a 2030 goal of reducing 2030 emissions by 40 percent from 2020 levels.

One of the key implementation programs is the Renewables Portfolio Standard (RPS) which mandates that renewable generation sources comprise at least 33 percent of electrical utilities' total power generation by 2020. Qualifying renewable generation sources include solar, wind, small hydro, geothermal, and biomass. In September 2018, Governor Brown signed SB 100, which updated the required renewables content of electricity generation to 50 percent by 2025 and 60 percent by 2030, and puts California on the path to implement a zero-carbon electricity grid by 2045.

A comprehensive description of the GHG setting and regulatory context of the Grape Solar Project area is provided in the Draft PEIR on the Westlands Solar Park Master Plan and Gen-Tie Corridors Plan, which is incorporated into this document by reference. The description of the overall GHG setting is found on pages 3.3-14 through 3.3-15 of the PEIR (WWD 2017b).

Environmental Evaluation

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

Less-than-Significant Impact. The Grape Solar Project would generate greenhouse gas (GHG) emissions through direct consumption of fossil fuels, primarily related to construction, traffic generation, and facility maintenance. The GHG emissions resulting from both project construction and operation were estimated by Illingworth & Rodkin using the CalEEMod model (see Appendix A of this document). The estimated emissions for the Grape Solar Project are presented in Table 10. As shown in Table 10, annual average project GHG emissions would be the equivalent of approximately 693 Metric Tons per year. The operation of solar facilities results in very low GHG emissions, given that the operational activities mainly consist of incidental maintenance. As such, the emissions from the initial construction activity and the post-project decommissioning activities are amortized over a 25-year period and added to operational emissions to yield annual average GHG emissions from solar projects, as shown in Table 10.

TABLE 10
ESTIMATED PROJECT GREENHOUSE GAS EMISSIONS

Project	Construction and Decommissioning Emissions ($MTCO_2e$)[1]			Annual Emissions ($MTCO_2e$)		
	Construction Emissions (Total)	Decommissioning Emissions (Total)[2]	Total Construction/ Decommissioning Emissions	Construction/ Decommissioning (Amortized)[3]	Project Operation	Total Annual Emissions
Grape Solar	7,098	7,098	14,196	568	125	693

[1] $MTCO_2e$ = Metric Tons CO_2 Equivalent
[2] Decommissioning emissions would likely be lower than construction emissions, but are assumed to be same for purposes of this analysis.
[3] Construction and decommissioning emissions are amortized over the 25 year life of the project.
Source: Illingworth & Rodkin 2021.

Under its mandate to provide local agencies with assistance in complying with CEQA in climate change matters, SJVAPCD has developed *Guidance for Valley Land-Use Agencies in Addressing GHG Emissions Impacts for New Projects under CEQA.* As a general principal to be applied in determining whether a proposed project would be deemed to have a less-than-significant impact on global climate change, a project must be determined to have reduced or mitigated GHG emissions by 29 percent relative to Business-As-Usual conditions. Under the SJVAPC guidance, a project that meets this emissions reduction target is considered to meet GHG emission reduction targets established in CARB's Scoping Plan for AB 32 implementation (SJVAPCD 2009). However, the use of the Air District's 29 percent reduction metric was substantially limited by the 2015 Newhall Ranch decision (*Center for Biological Diversity v. California Department of Fish and Wildlife).* In the Newhall Ranch decision, the appellate court held that while the 29 percent reduction is the statewide goal under AB 32, there is no substantial evidence to show that a nexus exists between the statewide goal and the percent reduction that a specific land use project would need to achieve in order to be consistent with the goals of AB 32. Therefore, if specific percentage reduction targets are to be applied, they must be demonstrably specific to the land use type proposed.

Kings County has not adopted its own significance thresholds for GHG emissions. However, CEQA allows lead agencies to rely on thresholds adopted or recommended by other agencies or recommended by experts (CEQA Guidelines Section 15064.7). Instead of applying percentage reduction targets to determine the significance of GHG emissions, per the SJVAPCD guidance, most California Air Districts utilize a mass emissions threshold, also known as a “bright-line” significance threshold which is expressed in terms of tons of annual emissions. Both the Bay Area Air Quality Management District (BAAQMD) and the Sacramento Metropolitan Air Quality Management District (SMAQMD) have adopted an emissions rate of 1,100 $MTCO_2e$/yr as the threshold of significance for defining GHG impacts for development projects under CEQA (BAAQMD 2017, SMAQMD 2020). In addition, the South Coast Air Quality Management District (SCAQMD) and the San Luis Obispo County Air Pollution Control District (SLOCAPCD) have established a bright-line screening threshold of 10,000 $MTCO_2e$/yr for industrial projects, and SCAQMD’s threshold specifically allows for amortization of construction emissions over 30 years, to be combined with annual operational emissions to determine total annual average GHG emissions (SCAQMD 2008, SLOCAPCD 2012). Also notable are the early recommendations by the California Air Pollution Control Officers Association (CAPCOA), which suggested a 900 $MTCO_2e$/yr threshold, which represents the most conservative threshold, and the California Air Resources Board (CARB), which recommended a threshold of 7,000 $MTCO_2e$/yr for industrial projects (CAPCOA 2008, CARB 2008). The Grape Solar Project’s estimated annual average emissions of 693 $MTCO_2e$/yr would fall well below all of the referenced thresholds adopted and recommended by other agencies and organizations. Therefore, the application of the bright-line methodology for determining the significance of the project’s GHG emissions, employing thresholds adopted or recommended by other agencies and organizations, results in the conclusion that the project’s GHG emissions would have a less-than-significant impact on the environment.

Upon completion, the 250 MW Grape Solar Project would generate approximately 581,250 MWh/yr., which is based on the average generation of 2,325 MWh/MW/yr for Kings County solar PV generating facilities in 2017 (CEC 2021). This is equivalent to the electrical consumption of 91,048 average California homes (at 6,384 KWh/yr per home)(EIA 2019). This electric power would be dispatched to the California Independent System Operator (CAISO) in accordance with a complex and dynamic formula that takes into account numerous variables in ongoing dispatching decisions to meet demand for electricity at any given time. One of those variables is compliance with the mandate to integrate electricity generated from renewable sources into the system at a predetermined rate, i.e., 60 percent renewables by 2030 as mandated by SB 100. Although the cost of fossil fuel sources (e.g., natural gas) is currently on par with renewable sources, fossil plants offer 24-hour reliability which solar cannot match. Thus it is expected that without the RPS mandate, these fossil sources would continue to be the dominant fuel source for electrical generation in California instead of being phased out. Therefore, renewable sources of electricity, such as solar generation, are considered to offset an equivalent amount of generation from other fuel sources, such as natural gas or coal, which would otherwise continue to be favored for dispatch to the grid by the CAISO in the absence of an RPS mandate. In other words, the installation and operation of solar facilities, like the Grape Solar Project, would result in a net reduction of fossil-based generation, and hence a net reduction in CO_2 emissions, relative to overall CO_2 emissions that would occur without the project.

In order to quantify the net reduction in CO_2 emissions that would be represented by the project, the CO_2 emissions from a fossil plant with the same electrical output was considered for comparison. The carbon intensity for an average natural gas fueled power plant in the U.S. is currently 0.419 $MTCO_2e$/MWh)(EIA 2020). Based on this emissions factor, a gas-fired plant generating 581,250 MWh/yr (the equivalent of the Grape Solar Project) would produce annual GHG emissions of approximately 243,544 $MTCO_2e$/yr. Compared to the Grape Solar Project's GHG annual emissions shown in Table 10 (i.e., operational emissions plus amortized construction and decommissioning emissions) of 693 $MTCO_2e$/yr (or 0.0012 $MTCO_2e$/MWh), the annual emissions from gas-fired power plant would be approximately 351 times greater. The Grape Solar Project would represent an annual net reduction of 242,851 $MTCO_2e$/yr, or a 99.7 percent net reduction in GHG emissions compared to the natural gas fueled alternative.

In summary, while the Grape Solar Project would result in a relatively low level of GHG emissions during project construction and decommissioning, the near-zero emissions from electrical generation during project operation would result in a net reduction of overall GHG emissions from electricity generation in California. Therefore, the greenhouse gas emissions generated by the project would have a *less-than-significant* effect on the environment.

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

No Impact. Kings County's GHG policies are set forth in 2035 General Plan Air Quality Element in AQ Goal 1, AQ Objective G1.1, and AQ Policy G1.1.1., which encourage the reduction of greenhouse gas emissions in the County's internal governmental operations and land use activities within its authority. As discussed above, the Grape Solar Project would result in a net overall reduction in GHG emissions, and therefore the project would be consistent with this General Plan goal, objective, and policy. In the Resource Conservation Element, RC Policies G1.2.1 through G1.2.6 promote the use of renewable energy sources such as solar, wind, and biomass projects, and provide guidance for their appropriate placement and project review (Kings County 2010b). The Grape Solar Project would advance the implementation of these policies by providing a new source of renewable energy, thereby helping to reduce GHG emissions. There are no other local plans, policies or regulations contained in the *2035 Kings County General Plan*, the *Kings County Development Code*, or other local guidelines or regulations which are directed toward the reduction of GHG emissions associated with land development projects. Therefore, the Grape Solar Project would not conflict with applicable local plans, policies, or regulations adopted for the purpose of reducing the emissions of greenhouse gases.

At the State level, the determination of significance under this criterion is based on whether the project would hinder or delay implementation of the statewide GHG reduction targets set forth in AB 32. The State's strategies for achieving the mandated 2030 GHG emissions reduction target are outlined in the 2017 Climate Change Scoping Plan adopted by the California Air Resources Board. One of the key strategies is the Renewables Portfolio Standard (RPS), which now requires all electric utilities in California to include a minimum of 60 percent renewable generation sources in their overall energy mix by 2030. As a solar photovoltaic generating facility, the Grape Solar Project will help increase the proportion of renewables in the statewide energy portfolio, thereby furthering the implementation of RPS by the target year instead of hindering or delaying its implementation. The addition of the project's solar generation to the state's electrical supply will help facilitate the retirement of existing older fossil-fueled generation plants, thereby avoiding or offsetting those sources of GHG emissions. Therefore, the Grape Solar Project would have *no impact* in terms of conflicting with a plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

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4.9. HAZARDS AND HAZARDOUS MATERIALS

Would the project:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	■	☐	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	■	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	■
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	■
e) For a project located within an airport land use plan or, where such plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	■	☐
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	■	☐
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	■	☐

The following discussion of hazards and hazardous materials is partially based on the Phase I Environmental Site Assessment (ESA) prepared on the project site by Moore Twining Associates (MTA) in February 2020, and the Soil Sampling and Pesticide Analysis report prepared by MTA in February 2020. The MTA reports are contained in Appendix E of this document.

The Phase I ESA by MTA consisted of the following: visual inspections of the site and surrounding areas; reviews of historical aerial photographs, historical topographic maps, local permit records, and other property data sources; reviews of federal and state regulatory lists of known or potential hazardous waste sites or landfills. As part of the Phase I ESA, a government records report, prepared by Environmental Data Resources (EDR), was obtained. This report searches federal and state databases, including California Government Code 65962.5 list (Cortese List) and databases maintained by the Regional Water Quality Control Board, for potential sources of hazardous substances or petroleum that might affect the soil and/or groundwater quality of the project site and its vicinity.

Setting

The Grape Solar Project site is an irregularly-shaped property, approximately 1,759 acres in size, located north of Nevada Avenue and east and west the unimproved 25th Avenue alignment in Kings County. The entire site consists of agricultural lands planted for winter wheat or fallow fields.

A large irrigation canal runs north-south through the central portion of the site along the 25th Avenue alignment. Two smaller canals are located in the eastern portion of the site, trending south-north. Another large canal (Empire Westside Main Canal) runs adjacent to the site at distances varying from 50 to 400 feet from the eastern project boundary. The 70-kV Henrietta to Tulare Lake sub-transmission line runs through the middle of the site from north to south along the 25th Avenue alignment. There are no buildings, sheds, wells, or other structures on the Grape Solar Project site.

Historical records indicate that five additional wells were located on the site in the past, although there is no remaining surface evidence of those wells.

Two agricultural water distribution pipelines traverse the project site from west to east, one lateral generally following the north side of Nevada Avenue, and the other lateral following the Manteca Avenue alignment one mile to the north. These underground pipelines are owned and managed by the Westlands Water District and are part of the District-wide system of lateral pipelines that deliver imported surface water from the California Aqueduct for the purpose of agricultural irrigation. Above-ground features of this system typically include light blue valves and piping protruding from the ground. The WWD water distribution system will provide water for operational use after project completion. The pipelines and their easements will be retained intact and will be incorporated into the project site plan.

One pole-mounted transformer is located at the southwest corner of the site. No staining or leaking was observed in the vicinity of the pole.

In the San Joaquin Valley, agricultural lands in active cultivation are typically subject to application of agricultural chemicals including pesticides. In order to determine whether any agricultural chemicals (specifically persistent pesticides) are present in the site soils in concentrations that exceed regulatory thresholds, MTA conducted a program of soil sampling and testing throughout the Grape Solar Project site. The analytical results indicated that the soils are below regulatory action levels for organochlorine pesticides, and the metals arsenic and lead (MTA 2020b).

No oil or natural gas wells (operating or abandoned) are present on the Grape Solar Project site or its immediate vicinity (i.e., within ½ mile). Southern Kings County and western Fresno County include several oil and natural gas fields. The nearest oil field is the abandoned Westhaven oil field located northwest of the project site in Fresno County. The nearest wells to the project site include four inactive oil wells located between 0.5 and 1.3 miles to the west, of which two are formerly productive (now idle) oil wells, one is a plugged well, and one is a dry hole. The nearest active oil fields include the Kettleman North Dome oil field, located 12 to 14 miles southwest, and the Coalinga oil field located 25 to 28 miles west of the project site. The nearest gas field is the abandoned Dudley Ridge gas field located 13 miles south of the project site (CalGEM 2020).

There is no evidence that the Grape Solar Project site includes any potential contamination due to disposal, spillage, or leakage of hazardous materials or any other source. A review of federal, state, and local databases indicated that there are no known hazardous materials sites on the project site or surrounding area.

Environmental Evaluation

a) Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Less-than-Significant Impact with Mitigation Incorporated. The Grape Solar Project would involve the use of hazardous materials during construction, project operation, and decommissioning, as discussed below.

Construction

The hazardous materials used during construction of the Grape Solar Project would include gasoline, diesel fuel, oils, lubricants, solvents, detergents, degreasers, paints, welding and soldering supplies, pressurized gases, etc. All hazardous materials would be stored in containers that are specifically designed for the materials to be stored. The fuels stored on-site would be in a locked container (aboveground storage tank) within a fenced and secure staging area.

During construction, substantial quantities of gasoline, diesel fuel, and transformer insulating oil (mineral oil) will be transported to the site. A spill of these hazardous liquids en route to the project site could result in significant impacts to soil, surface water, groundwater, or the public. However, such materials are routinely and safely transported on public roadways. The transport of large quantities of hazardous materials is strictly regulated by the California Highway Patrol (CHP). Large quantities of hazardous materials used during project construction would be transported along regulated routes by a licensed transporter, and would not pose a significant hazard to the public or the environment.

During construction of the solar facilities, minor spills or discharges of hazardous materials could occur due to improper handling, storage, and/or disposal. Unless mitigated, this would represent a significant impact. In order to reduce the potential impacts from hazardous materials to less-than-significant levels, the following mitigation measure shall be implemented in conjunction with the project.

Mitigation Measure HAZ-1: Protection from Hazardous Materials*. In order to protect the public from potential release of hazardous materials, the following measures shall be implemented during project construction, operation, and decommissioning:*

a. The project applicant shall prepare and implement a Hazardous Materials Business Plan (HMBP) in accordance with the requirements of, and to the satisfaction of, the Kings County Public Health Department Environmental Services Division;

b. The project applicant shall prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) in accordance with the requirements of the State Water Resources Control Board, and to the satisfaction of the Central Valley Regional Water Quality Control Board.

> *The potential for minor spills would be largely avoided through implementation of the Hazardous Materials Business Plan (HMBP), as required under the Hazardous Materials Release Response Plan and Inventory Act of 1985. Under this state law, the applicant is required to prepare an HMBP to be submitted to the Kings County Public Health Department, Environmental Health Services Division, which is the Certified Unified Program Agency (CUPA) for Kings County. The HMBP would include a hazardous material inventory, emergency response procedures, training program information, and basic information on the location, type, quantity, and health risks of hazardous materials stored, used, or disposed of at the proposed project site, and procedures for handling and disposing of unanticipated hazardous materials encountered during construction. The HMBP would include an inventory of the hazardous waste generated on site, and would specify procedures for proper disposal. As required, hazardous waste would be transported by a licensed hauler and disposed of at a licensed facility. According to the HMBP reporting requirements, workers must be trained to respond to releases of hazardous materials in accordance with State and federal laws and regulations governing hazardous materials and hazardous waste (e.g., HAZWOPER training required by OSHA). Any accidental release of small quantities of hazardous materials would be promptly contained and abated in accordance with applicable regulatory requirements and reported to the Environmental Health Services Division. As the CUPA for Kings County, the Environmental Health Services Division of the County Public Health Department is responsible for implementation and enforcement of HMBPs. Implementation of the HMBPs for each phase of the Grape Solar Project would ensure that minor spills or releases of hazardous materials would not pose a significant risk to the public or the environment.*

As specified in Mitigation Measure HAZ-1, the project proponent will be required to prepare, or to have prepared, and to implement a Storm Water Pollution Prevention Plan (SWPPP) for the project, as required by the State Water Resources Control Board (SWRCB)(for a detailed discussion, see Section *4.10. Hydrology and Water Quality*). The SWPPP will specify best management practices for control, containment of hazardous materials during construction, including housekeeping measures for control of contaminants such as petroleum products, paints and solvents, detergents, fertilizers, and pesticides, as well as vehicle and equipment fueling and maintenance practices, and waste management and disposal control practices, among other things. The project SWPPP will be prepared by a certified Qualified SWPPP Developer (QSD), who will ensure that the BMPs in the project-specific SWPPP will fully comply with the requirements of the General Permit. The enforcement of project SWPPP is the responsibility of the Central Valley Regional Water Quality Control Board, whose responsibilities include conducting inspections of the project construction sites to ensure effective implementation of Best Management Practices (BMPs) specified in the SWPPP prepared for the project.

Additionally, the use, storage, transport, and disposal of construction-related hazardous materials and waste would be required to conform to existing laws and regulations. These include the Hazardous Material Transportation Act, Resource Conservation and Recovery Act, California Hazardous Waste Control Act, Unified Program, and California Accidental Release Prevention Program. As the local Certified Unified Program Agency (CUPA), the Kings County Environmental Health Services Division (KCEH) coordinates and makes consistent enforcement of several state and federal regulations governing hazardous materials. For example, KCEH administers the Accidental Reporting Program, Hazardous Materials Business Plans, Above Ground Storage Tank Program, and Underground Storage Tank Program.

In summary, the implementation of Mitigation Measure HAZ-1 would ensure that hazardous materials used in project construction are handled, stored, and disposed of in accordance with the SWPPP required to be implemented in conjunction with the project, with oversight by the responsible agencies. (Note: The HMBP applies only to project operations, discussed below.) Therefore, implementation of Mitigation Measure HAZ-1 would reduce potential for impacts to the public and the environment from routine transport, use, and disposal of hazardous materials during project construction to *less-than-significant* levels.

Project Operation

Operation and maintenance of the Grape Solar Project would involve the transport, use, and disposal of minor amounts of hazardous materials, including motor vehicle fuel, lubricants, inverter coolant, cleaning chemicals, paint, pesticides, herbicides, and fire suppressant. Materials would be stored in temporary above-ground storage tanks or in secure sheds or fenced areas. During operation, certain project components, such as switchgears, transformers, and inverters, may contain small quantities of hazardous materials. The transformers within the solar facility PCSs would contain mineral oil, although transformer oil does not ordinarily require replacement. The transformers would be provided with secondary containment to minimize hazard from any leaks or spills. Large quantities of hazardous substances would not be routinely transported or used during operation, except for transformer oil during major maintenance activities.

The project substation would be designed with secondary containment that would accommodate an accidental spill of transformer fluid. Should an oil spill occur, the oil would be captured by the secondary containment and disposed of by O&M personnel. During operation of the solar facilities, minor spills or discharges of hazardous materials could occur due to improper handling, storage, and/or disposal. Unless mitigated, this would represent a significant impact. In order to reduce the potential impacts from hazardous materials during project operations to less-than-significant levels, Mitigation Measure HAZ-1, as set forth above, would be implemented in conjunction with the project.

As described above for the construction phase, compliance with existing laws and regulations governing the handling, storage, containment, clean-up, and disposal of hazardous materials and hazardous waste would minimize the risk to the public and the environment of exposure to hazardous materials. Mitigation of such impacts would be ensured through implementation of Mitigation Measure HAZ-1.

Although not currently proposed, it is possible that the Grape Solar Project could employ thin-film modules containing Cadmium-Telluride (CdTe) which is classified as a hazardous material. In any solar facility, it is expected that some modules will occasionally need replacement during the life of the facility. The potential hazards associated with CdTe PV modules are addressed in detail under item 'b' below.

The project's energy storage facility would include a number of prefabricated electrical enclosures containing battery banks and associated switchboards, inverters and transformers. All battery containers would be installed on concrete foundations designed to provide secondary containment. The enclosures would have appropriate fire suppression systems built to code. Each energy storage unit used on site will be designed in compliance with Section 608 of the International Fire Code, which has been adopted by the State of California to minimize risk of fire from stationary storage battery systems and contain fire in the event of such an incident. Under California law, the battery enclosures also must comply with Article 480 of the Electrical Code, which presents requirements for stationary storage batteries. Article 480 provides the appropriate insulation and venting requirements for these types of systems, further preventing associated risk of fire from the battery enclosures on the project site. Depending on the technology and design of the battery units, the Kings County Fire Department may require purchase of specialized hazmat vehicles and equipment along with mandated training for Fire Department personnel.

Herbicides would be used at the Grape Solar Project to control noxious weeds and invasive species, in accordance with the Weed Abatement Plan to be prepared for the project in accordance with the Kings County Development Code. The herbicides would be applied by a licensed herbicide applicator, in compliance with the regulations of the U.S. EPA, and the California Department of Pesticide Regulation (DPR). As discussed in item 'b' below, modern herbicides and pesticides degrade rapidly and therefore are not considered to pose a contamination hazard according to the California Department of Toxic Substances Control (DTSC 2008). As also discussed in item 'b', past agricultural practices on the project site involved the use of environmentally persistent pesticides, although recent soil testing showed that residual concentrations of these "legacy" pesticides in soils at the site are well below hazardous levels (MTA 2020b).

In summary, the implementation of Mitigation Measure HAZ-1 would ensure that hazardous materials used in project operation are handled, stored, and disposed of in accordance with the HMBP and SWPPP required to be implemented in conjunction with the project, with oversight by the responsible agencies. Therefore, implementation of Mitigation Measure HAZ-1 would reduce potential for impacts to the public and the environment from routine transport, use, and disposal of hazardous materials during project construction to *less-than-significant* levels.

Decommissioning

As described in Section *2.2. Project Description*, when the Grape Solar facility reaches the end of its productive life, the solar arrays and supporting infrastructure would be disassembled and removed, with all materials recycled, reused, or disposed of as appropriate in accordance with the Soil Reclamation Plan to be prepared as prescribed in Mitigation Measure AG-2. The materials to be removed would include solar arrays, inverters, transformers, cabling and wiring, perimeter fencing, batteries, among other things. During decommissioning of the solar facilities, minor spills or discharges of hazardous materials could occur due to improper handling, storage, and/or disposal. Unless mitigated, this would represent a significant impact. In order to reduce the potential impacts from hazardous materials during project decommissioning to less-than-significant levels, Mitigation Measure HAZ-1, as set forth above, would be implemented in conjunction with project decommissioning. At the time of decommissioning, the project SWPPP would be updated or replaced with a new SWPPP which would be tailored specifically to decommissioning activities.

As discussed above, the project could include solar modules containing CdTe. The potential hazards associated with removal of CdTe PV modules are addressed in detail under item 'b' below.

In conclusion, the handling, use, storage, transport, and disposal of hazardous materials during the construction, operation, and decommissioning of the Grape Solar Project could potentially result in significant hazards to the public and the environment. The implementation of Mitigation Measure

HAZ-1, as set forth above, would reduce the potential hazard to the public or the environment from routine transport, use, or disposal of hazardous materials associated with the Grape Solar Project to *less-than-significant* levels.

b) Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Less-than-Significant Impact with Mitigation Incorporated. There are five conditions associated with the Grape Solar Project that have the potential to release hazardous materials into the environment. These include: 1) accidental release of hazardous materials from solar panels; 2) hazards associated with storage batteries; 3) exposure to valley fever; 4) exposure to residual agricultural chemicals; and 5) exposure to aerially-deposited lead. These conditions are discussed in turn below.

1. Hazardous Materials in Solar Panels

There are two dominant semiconducting materials used in photovoltaic technology including: crystalline silicon (c-si) which is the conventional material used in flat plate panels; and thin-film semiconductors such as amorphous silicon (a-si) and cadmium telluride (CdTe). The silicon based solar cells do not contain hazardous materials, although they may use lead-containing solders. Improper decommissioning of the panels with lead-containing solders could result in lead leaching into landfills and eventually into waterbodies. The applicant would recycle, reuse, or dispose of solar PV cells in compliance with all applicable local, state, and federal regulations.

CdTe is a hazardous substance when not imbedded within a PV module. (Cadmium compounds are classified by US EPA as a probable human carcinogen (US EPA 2016)). Although not currently planned, it is possible that the Grape Solar Project could include thin film modules with CdTe. At present, CdTe is only contained in modules manufactured by First Solar Inc.

During the manufacturing process, the CdTe semiconductor layer is sealed between two sheets of glass. CdTe contained within PV modules is highly stable and no emissions of any kind are generated when PV modules are used under normal conditions (Fthenakis 2003). The primary manufacturer and operator of solar facilities with CdTe PV modules, First Solar, has a program for recycling modules at the end of their 25-year life cycle. During the recycling and refining process, up to 90 percent of the semiconductor material is recovered for reuse in new modules (First Solar 2020).

In summary, the potential for emissions of CdTe is negligible during normal use of CdTe PV modules. Recycling of CdTe modules is preferable to disposal at a landfill, from a waste reduction and materials recovery standpoint, and a manufacturer's program is in place to accept used CdTe PV modules. However, since the evidence indicates there is a negligible human health risk associated with CdTe modules, mandatory recycling of these modules is not required.

Under California law, PV modules are classified as universal waste (e-waste), and are not considered to be hazardous waste. In late 2020, the California Office of Administrative Law (OAL) approved regulations, effective January 1, 2021, for managing PV modules as universal waste (DTSC 2020). The adopted regulations include specific requirements for handling, transport, treatment, and disposal of discarded PV modules. All PV modules brought to the project site that are deemed unusable will be recycled at a private facility by the project operator, or handled and disposed of as universal waste.

In conclusion, the potential use and disposal of PV modules at the Grape Solar Project would not result in a significant risk of a release of hazardous materials that would be harmful to human health or the environment. Therefore, the potential for health hazard from PV modules would represent a *less-than-significant impact*.

2. Storage Batteries

The project would include energy storage facilities consisting of a number of prefabricated electrical enclosures containing battery banks and associated switchboards, inverters and transformers. The battery storage systems would be subject to potential explosion and fire hazards, and possible discharge of hazardous materials. The batteries would be enclosed in metal cargo containers which would be installed on concrete foundations designed to provide secondary containment. The enclosures would have appropriate fire suppression systems built to code. Each energy storage unit used on site will be designed in compliance with Section 608 of the International Fire Code, which has been adopted by the State of California to minimize risk of fire from stationary storage battery systems and contain fire in the event of such an incident. Under California law, the battery enclosures also must comply with Article 480 of the Electrical Code, which presents requirements for stationary storage batteries. Article 480 provides the appropriate insulation and venting requirements for these types of systems, further preventing associated risk of fire from the battery enclosures on the project site. Depending on the technology and design of the battery units, the Kings County Fire Department may require purchase of specialized hazmat vehicles and equipment along with mandated training for Fire Department personnel. Therefore, the potential hazards associated with storage batteries would be represent a *less-than-significant impact*.

3. Valley Fever

The project site is located in an area that may harbor the fungus that causes Valley Fever (*coccidioidomycosis*), a lung disease common in the southwestern United States. Valley Fever is caused by the fungus *Coccidioides immitis*, which grows in soils in areas of low rainfall, high summer temperatures, and moderate winter temperatures. The fungus is prevalent in the soils of the San Joaquin Valley, including Kings County, where the average annual exposure rates are more than 100 in 100,000 people (CDPH 2019). The fungal spores become airborne when the soil is disturbed by winds, construction, farming, or other activities. Most people who inhale the spores do not get sick. Usually, susceptible individuals experience flu-like symptoms and will feel better on their own within weeks, although some people require antifungal medication (CDC 2020). There is an increased risk of exposure to people working in construction and agriculture due to their proximity to potential release of airborne spores.

The fungal spores that cause Valley Fever are most prevalent in undisturbed soils. Since the land in Kings County consists predominantly of disturbed agricultural land, the risk of infection due to developments on agricultural land is considered low (Kings County 2009b). However, the fungal spores are too small to be seen and it is unknown if the soils of the project site contain Valley Fever spores. As such, there is a potential for on-site workers to become infected. The potential for airborne release of Valley Fever spores would be greatest during construction and decommissioning when soils are temporarily exposed and disturbed by grading and excavation activity. The health risk to workers from potential exposure to valley fever represents a potentially significant impact. In order to reduce the potential health impacts from Valley Fever to less-than-significant levels, the following mitigation measures shall be implemented in conjunction with the project.

Mitigation Measure HAZ-2: Preventing Valley Fever Exposure. *In order to protect the public and workers from Valley Fever, the following measures shall be implemented during project construction and decommissioning:*

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

b. Provide workers with NIOSH-approved respiratory protection with particulate filters rated as N95, N99, N100, P100, or HEPA, as recommended in the California Department of Public Health publication "Preventing Work-Related Coccidioidomycosis (Valley Fever)," available at http://www.cdph.ca.gov/programs/hesis/Documents/CocciFact.pdf.

The implementation of these measures in conjunction with project construction and decommissioning would minimize the risk of exposure of workers to Valley Fever. Therefore, the potential hazard to the public from potential exposure to Valley Fever would be reduced to *less-than-significant* levels.

4. Residual Agricultural Chemicals

Organochlorine Pesticides from Past Agricultural Practices

In the past, agricultural practices commonly included the application of environmentally persistent pesticides such as DDT, Aldrin, dieldrin, and mirex. Collectively known as organochlorine pesticides (OCPs), these compounds were found to be toxic and bioaccumulative, and were banned from use, beginning in 1974 for DDT, and quickly thereafter for other OCPs in California. Due to the environmental persistence of these compounds, residual concentrations may still be present in the soils where they were applied. For example, the half-life of DDT in soil is 2-15 years depending on local climate conditions, while most other OCPs (and POPs – Persistent Organic Pesticides, like Toxaphene) have half-lives of up to 12 years. Thus, a compound with a 15-year half-life would be 50 percent degraded after 15 years, 75 percent degraded after 30 years, 87.5 percent degraded after 60 years, and so on. Assuming DDT was applied on a site, and that the last application was in 1974, and also assuming the high end of the range for its half-life (i.e., 15 years), the concentration of DDT would have degraded to less than 20 percent of its original strength during the 47 years between 1974 and 2021.

While there is some potential for these "legacy pesticides" to be present on agricultural lands in hazardous concentrations, it is considered more likely that high concentrations would be found in areas where the chemicals were loaded, stored, or mixed. Incidences of such contamination are associated with the "hot spots" resulting from occasional spillage at chemical storage sites and have not been found to be associated with areas where the chemicals were merely broadcast over the crops. Thus, unless chemical mixing has occurred, there is typically a low potential for environmentally persistent pesticides/herbicides related to crop cultivation to exist in the near-surface soils at concentrations which would require regulatory action.

It is unknown whether OCPs or POPs were applied at the site before they were banned in the 1970s. If they were applied, there is a low likelihood that the soils are contaminated, particularly since there is no evidence that mixing of agricultural chemicals occurred on the Grape Solar Project site in the past. The project site was part of a much larger agricultural operation, and has not historically been used for mixing or loading of pesticides, which was conducted off the project site. Thus it is highly unlikely that legacy pesticides like DDT would be present on the project site in hazardous concentrations. In order to determine if the soil on the project site contains any significant concentrations of environmentally persistent agricultural chemicals, a program of soil sampling and testing was performed by Moore Twining Associates (MTA) in February 2020. The analytical results showed that the soils are well below regulatory screening levels for organochlorine pesticides, as well as Toxaphene.

The lab tests found that the concentrations of arsenic in the soil samples ranged from 5.6 to 12 mg/kg, which exceed the Department of Toxic Substances Control (DTSC) screening levels (0.11 mg/kg residential and 0.42 mg/kg commercial). However, the DTSC has acknowledged that background concentrations of arsenic in California soils can average 12 mg/kg in some areas. As such, the elevated concentrations on the project site would not require cleanup to screening levels.

The MTA report stated that no further action is necessary with regard to residual agricultural chemicals on the project site (MTA 2020b). Therefore, the potential impact due to exposure to residual agricultural chemicals or aerially deposited lead is *less than significant*.

<u>Recent Use of Agricultural Chemicals</u>

The pesticides which may have been applied at the Grape Solar Project site in the recent past consist of non-persistent compounds that degrade rapidly (within a few days or weeks) after application. The longest-lived pesticides include paraquat and glyphosphate (Roundup), which have half-lives of approximately 1,000 days and 100 days, respectively (UCD 2020). Since no pesticides have been applied on the site since at least 2014 (see below), any pesticide concentrations at the site from the applications in years prior to project development would have degraded to non-detectable levels by the time of site development. The Department of Toxic Substances Control (DTSC) does not recommend sampling for currently permitted pesticides since they have relatively short half-lives. While paraquat does have a longer half-life in soil, it has not been detected or rarely detected at trace levels at sites which DTSC has had oversight; therefore, routine analysis for paraquat is not required for field areas. Analysis for paraquat may be required in storage and mixing/loading areas (DTSC 2008). There is no evidence that mixing or loading of paraquat or other pesticides has been conducted on the project site. Moreover, the lands of the Grape Solar Project site have been retired from irrigated agriculture since the early 2000s when they were acquired by Westlands Water District, and no pesticides or herbicides have been used on the project site for at least the past seven years (i.e., no pesticide use since at least 2014). Given these facts, and based on DTSC's guidance and experience, it is concluded that hazardous concentrations of paraquat are not present at the site.

It is also noted that the routine application of registered pesticides is not a Recognized Environmental Condition (REC) by the American Society for Testing and Materials (ASTM) if applied according to the labeling instructions (Lavey 2014, MTA 2020a).

Based on the information and analysis presented above, it is concluded that residual agricultural pesticides are not present on the Grape Solar Project site in hazardous concentrations. Therefore, the potential hazard to the public and workers from exposure to residual agricultural chemicals at the Grape Solar Project site represents a *less-than-significant* impact.

5. Aerially-Deposited Lead

Elevated lead concentrations may exist in soils along roadways as result of lead that was emitted from vehicle exhausts before leaded gasoline was phased out between 1976 and 1996. Lead poses potential health risks related to inhalation, ingestion, and dermal contact with lead-containing soil. Potential hazards to workers and the public exist if soils with elevated lead concentrations are disturbed during ground disturbing activities.

In order to determine whether elevated concentrations of lead are present on the project site, soil samples were taken by MTA along the project's Nevada Avenue frontage where lead concentrations would be highest. The lab analysis of the soil samples showed that lead levels were well below the regulatory limits. MTA's lab report stated that no further action is necessary with regard to residual aerially deposited lead on the project site (MTA 2020b). Therefore, the potential impact due to exposure to residual aerially-deposited lead is *less than significant*.

c) Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

No Impact. There are no schools within one-quarter mile of the Grape Solar Project site. The nearest schools are located in: Stratford (4.0 miles northeast), NAS Lemoore (7.5 miles north), Huron (10 miles northwest), and Kettleman City (9 miles south). The Grape Solar Project would result in *no hazardous materials impacts* to schools in the vicinity.

d) Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

No Impact. There are no hazardous materials sites on the Grape Solar Project site or surrounding properties listed on the Department of Toxic Substances Control's (DTSC's) Hazardous Waste and Substances Site List (Cortese List) compiled pursuant to Government Code Section 65962.5 (DTSC 2019). A comprehensive search by MTA of all federal, state, and local database information systems likewise indicated no listed hazardous materials sites. A review of files for the Grape Solar Project site and adjacent properties at the Kings County Environmental Health Department (KCEHD), and State Water Resources Control Board (SWRCB) likewise identified no documentation for the project site or adjacent properties (MTA 2020a). Therefore, the project would have *no impact* to the public or environment by being located on a listed hazardous material site.

e) For a project located within an airport land use plan or, where such plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

Less-than-Significant Impact. The Grape Solar Project site is not located within an airport land use plan or within two miles of a public airport or public use airport. The nearest public or public use airports include the Hanford and Coalinga municipal airports, located 18 and 20 miles from the project site, and the Harris Ranch airfield, located 18 miles from the project site.. The airfield at Naval Air Station Lemoore (NASL) is located 9.0 miles north of the Grape Solar Project site. While the project site is not within an 'airport land use plan,' it is included in the Military Influence Area of Naval Air Station Lemoore (NASL), and is within the study area of the NAS Lemoore Joint Land Use Study (JLUS). The JLUS has no jurisdictional effect on the project but includes relevant information regarding potential safety hazards posed by NASL operations upon the project. The project site is located 7.2 miles south of the nearest accident potential zone mapped for NASL. The project site is entirely outside NASL flight approach/departure zone, the southern end of which is approximately 0.5 miles north of the project site (JLUSPC 2011). Therefore, the project is not subject to the height restriction of 500 feet above ground level for this zone, as regulated by the Federal Aviation Administration. In any event, the tallest structures within the project would be well within this height limit. For example, the structural elements associated with the on-site substation would be as high as 75 feet; the solar arrays and inverter pads would be as tall as 8 feet, and meteorological stations would be approximately 11 feet high. The monopoles of the associated portion of gen-tie line running along the 25th Avenue alignment through the site would be 100 feet tall, while the gen-tie segment running along the south site boundary on Nevada Avenue would include poles up to 165 feet tall. Thus, even if the project were subject to the NASL height restrictions, the tallest project features would be well within the 500-foot height limit for physical obstructions within the nearest NASL approach/departure zone. The height of all of the project structures would also be below the 200 feet height limit above which structures are considered a potential collision hazard under federal law (CFR, Title 14, Aeronautics and Space, Section 77.17 Obstruction Hazards).

Given the proximity of NAS Lemoore to the Grape Solar Project site, there is a potential concern with the effect of glare on flight operations originating from the base. All of the solar panels installed at the project will be composed of photovoltaic cells. Solar PV employs glass panels that are designed to maximize absorption and minimize reflection to increase electricity production efficiency. To limit reflection, solar PV panels are constructed of dark, light-absorbing materials, and are given an anti-reflective coating or a textured surface which can reduce reflectivity to less than 4 percent of incoming sunlight (EE Times 2012). In comparison, the reflectivity of standard glass is over 20 percent. By contrast, concentrating solar thermal systems, which employ arrays of highly polished mirrors to refocus the radiation on a receiver tube or tower, reflect about 90 percent of the incoming sunlight (FAA 2010).

The NAS Lemoore Joint Land Use Study (JLUS) addresses concerns with aviation hazards from reflection and glare. Solar facilities are mentioned specifically for their potential to produce reflective surfaces, but the JLUS acknowledged that the main concern is with highly reflective mirrors used in concentrating solar thermal facilities. The JLUS states that "if there is no central collection tower, the new solar panels can be made non-reflective and arrays could be installed to not cause any height or reflective issues" (JLUSPC 2011, p. 2-12). PV solar facilities have been installed within military air bases elsewhere the U.S. without adversely affecting flight operations. For example, as of 2018, the

U.S. Air Force had solar PV facilities at 16 air bases in the United States, including Vandenberg AFB, Edwards AFB, Los Angeles AFB, and Nellis AFB (USAF 2020).

It is noted that a glint and glare study using the Sandia Laboratory's Solar Glare Analysis Tool (SGHAT) was prepared for the nearby Mustang Two Solar Project MND in August 2016. In the analysis, impacts from solar glare were given three ranks, as follows: 1) potential for permanent eye damage; 2) potential for temporary after-image (a lingering image of the glare in the field of view); and 3) low potential for temporary after-image. Results from the analysis indicated that pilots flying over and near the solar facility would experience a low potential for a temporary after-image, and the potential would be limited to early morning from approximately April through September. The low potential for temporary after-image level is generally considered to be safe for pilots (Kings County 2017). The results of this glint and glare analysis are considered to be applicable to the Grape Solar Project, which is 2.5 miles south the Mustang Two Solar Project site and is partially located within the same flight approach/departure path. Therefore, it is concluded that the PV solar panels installed at the Grape Solar Project site would not produce light or glare that would pose a hazard to flight operations at NAS Lemoore.

With respect to aircraft noise from military overflights, the project site is located within the NAS Lemoore flight pattern and is mapped as land subject to noise levels lower than 70 dBA CNEL as mapped in the NAS Lemoore Joint Land Use Study. The eastern third of the project site is exposed to noise levels between 60 and 70 dBA CNEL, while the western two-thirds of the site is exposed to noise levels of less than 60 dBA CNEL (JLUSPC 2011, p. 2-11). Noise levels exceeding 76 dBA CNEL are considered hazardous to health as determined by the US Environmental Protection Agency (US EPA 1974). Aircraft overflights would expose construction workers, who would be on the site temporarily, and the operational workers, who would visit the site periodically, to worst-case noise levels of less than 70 dBA CNEL, which is well below the 76 dBA CNEL threshold. Therefore, the project would not expose workers on the project site to excessive noise levels from flight operations as NAS Lemoore.

Additionally, the employment density at the Grape Solar Project would be very low. No staff would be permanently stationed at the site, with one or two staff visiting the site regularly, and with up 10 staff present when panel cleaning and maintenance activities are in progress. Therefore, the Grape Solar Project would not result in a significant safety hazard to on-site employees due to the proximity of public airports or public use airports. As such, the potential for the project to be adversely affected by aviation hazards is *less than significant*.

f) Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Less-than-Significant Impact. In 2015, the Kings County Board of Supervisors adopted the County of Kings Emergency Operations Plan (EOP). The EOP, which is overseen and managed by the Kings County Office of Emergency Services (OES), addresses the County's response to extraordinary emergency situations associated with large-scale disasters, technological incidents, and national security emergencies which can pose major threats to life, property and the environment. The EOP does not apply to normal day-to-day emergencies or the established departmental procedures for responding to such emergencies. The EOP assigns functions and tasks consistent with California's Standardized Emergency Management System (SEMS) and the National Incident Management

System (NIMS). In a large scale emergency, the plan would be activated by the Kings County OES which would take the lead in coordinating multiple jurisdictions in implementing the plan (Kings County 2015). The construction and operation of the Grape Solar Project would not impair or interfere with the operations of the OES or its support system, including the Kings County Fire Department and Sheriff's Office, and other agencies and organizations responsible for implementing the EOP. For example, the project entrances and internal driveways would be designed and constructed in accordance with all applicable design standards for emergency access (e.g., minimum lane width and turning radius to allow the passage of emergency vehicles). The project would also incorporate all applicable design and safety requirements in the most current adopted fire codes, building codes, and nationally recognized fire and life safety standards of the County and KCFD. Compliance with these codes and standards is ensured through the County's and KCFD's development review and building permit process. Also, the Grape Solar Project would not be considered a critical facility to provide essential services during and after a disaster. As such, the Grape Solar Project would not impair implementation of, or physically interfere with the Kings County Emergency Operations Plan.

In times of emergency or disaster response, the nearby State highways would serve as primary evacuation routes, and designated County arterial roadways in the area would serve as secondary routes. In the project vicinity, the primary evacuation routes include SR-41, SR-198, SR-269, and I-5, and the designated secondary routes consist of Avenal Cutoff Road and Laurel Avenue (Kings County 2010e). These nearby State highways and County roads provide several alternative escape routes with relatively low ambient traffic volumes. Nevada Avenue would provide a local escape route for the project. The Grape Solar Project would not result in changes to the adjacent roadway network, and the solar facility's small operational workforce would not create or increase traffic congestion during times of emergency or disaster. During the construction phase, slow moving vehicles or trucks delivering large pieces of equipment or components could result in traffic slowdowns, although such conditions would be temporary and infrequent and would be managed pursuant to traffic controls specified in Mitigation Measure TR-1 (see Section *4.17. Transportation*).

In summary, the Grape Solar Project would not impair implementation of, or physically interfere with, an adopted emergency response plan or an emergency evacuation plan, and therefore the potential impact in this regard would be *less than significant*.

g) Would the project expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?

Less-than-Significant Impact. The Grape Solar Project is not located within or near a wildland fire hazard area. The Fire Hazard Severity Zone (FHSZ) map for Kings County prepared by the California Department of Forestry and Fire Protection (CAL FIRE) shows the project site as "unzoned" for fire hazard. The nearest areas zoned on the FHSZ map are located in the foothills west of Interstate 5, which are zoned "Moderate Severity Fire Hazard" (CALFIRE 2007). The Health and Safety Element of the Kings County General Plan includes a map of Potential Fire Hazards which shows project area as being subject to "little or no threat" (Kings County 2010e). Therefore, the risk of wildland fire at the Grape Solar Project is *less than significant*.

[For additional discussion on fire hazard and protection, see Sections *4.15. Public Services* and *4.20. Wildfire*.]

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4.10. HYDROLOGY AND WATER QUALITY

Would the project:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant	No Impact
a) ***Violate any water quality standards or waste discharge requirements, or otherwise substantially degrade surface or ground water quality?***	☐	☐	■	☐
b) ***Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such the project may impact sustainable groundwater management of the basin?***	☐	☐	■	☐
c) ***Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:***				
i. result in substantial erosion or siltation on- or off-site;	☐	■	☐	☐
ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;	☐	☐	■	☐
iii. create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	☐	■	☐
iv. impede or redirect flood flows?	☐	☐	☐	■
d) ***In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation??***	☐	☐	☐	■
e) ***Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?***	☐	☐	☐	■

Hydrologic Setting

A comprehensive description of the hydrological setting and regulatory context of the Grape Solar Project area is provided in the Draft PEIR on the Westlands Solar Park Master Plan and Gen-Tie Corridors Plan, which is incorporated into this document by reference PEIR pursuant to Section 15150 of the State CEQA Guidelines. The description of the overall hydrological setting is found on pages 3.2-1 through 3.2-20 of the Draft PEIR (WWD 2017c). A description of the specific conditions relevant to the Grape Solar Project site is provided below.

Kings County receives runoff from the Sierra Nevada as it is carried in creeks, rivers and sloughs as far west as the Kings River which flows in a west-southwesterly direction to the Tulare Dry Lakebed, passing through the project vicinity approximately 2 miles to the east of the Grape Solar Project site. The drainage courses originating in the Coast Ranges to the west dissipate west of the California Aqueduct, approximately 7 miles west of the project site. The project area is virtually level and has no natural drainage features. The relatively low annual rainfall (~6.6 inches) in the project area is absorbed by the soil and crop cover, with little or no runoff leaving the site.

Several irrigation canals pass through and alongside the project site. These canals convey and distribute surface water and pumped well water throughout the area. There are two major canals that pass through or along the project site, including: 1) an irrigation canal that runs through the center of the project site in a north-south direction adjacent to the 25th Avenue alignment; and 2) a canal that runs roughly parallel and east of the project site (Empire Westside Main Canal), trending northeast-southwest at distances varying from 50 to 400 feet from the eastern site boundary. There are two smaller canals that traverse the eastern portion of the project site in a north-south direction.

There are no agricultural wells within the Grape Solar Project site. The nearest active well is located within the Cherry Solar Project site on the south side of Nevada Avenue opposite the Grape Solar Project site.

Environmental Evaluation

a) Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

Water Quality Standards and Waste Discharge Requirements

Less-than-Significant Impact. Water quality standards can refer to drinking water standards or surface water standards. Further, there are separate surface water standards for discharges from wastewater treatment plants and for discharges of stormwater. These are discussed in turn below.

Drinking Water Standards - No Impact: Drinking water standards are implemented by the State Water Resources Control Board, and are applicable to local water distribution systems for domestic water supply. There are no plans to install a domestic water distribution as part of the Grape Solar Project. Since drinking water for construction and operational staff would be provided by bottled water delivered by truck, the drinking water standards would be applicable at the water bottling plant. (See Section *4.19. Utilities and Service Systems* for a detailed discussion of water supply.)

Wastewater Treatment Standards – Less-than-Significant Impact: Waste Discharge Requirements generally refers to standards applied to local wastewater treatment facilities by the Regional Water Quality Control Board for quantities and quality of wastewater discharge. Individual septic systems are regulated under the Kings County Plumbing Code, which sets forth design criteria and standards for their installation. The general requirements for septic leachfield design are indicated on County's "Septic Tank Absorption Map," which classifies the County soils into four broad categories and indicates general specifications for the number of square feet of leaching area required for each 100 gallons of septic tank capacity for each soil category. Most of the Grape Solar Project site is mapped as Soil Type "B" which requires 60 square feet of leaching area for each 100 gallons of septic tank capacity. An approximately 100-acre area in the northeast corner of the project site is mapped as an area where an engineered septic system would be required due to the presence of perched groundwater conditions (Kings County 2001). The Grape Solar Project will utilize an on-site septic tank and leachfield system for disposal of wastewater associated with the O&M building, which is planned to be located in the south-central portion of the project site, near the intersection of Nevada Avenue and the

25th Avenue alignment. This location is well within the Soil Type "B" area and at least one mile southwest of the area where the County would require an engineered septic system. As such, soils in the planned leachfield area would be capable of adequately supporting the use of a septic tank for the project.

As noted previously, the daily staffing needs during project operations would vary considerably depending maintenance and repair activities required on any given day. However, it is expected that the average staff level would be up to 10 workers per day. Based on a peak wastewater generation rate of 50 gallons per day (gpd) per person, the average peak daily volume of wastewater generated would be approximately 500 gallons. This is well below the 2,500 gpd threshold where Waste Discharge Requirement (WDRs) would be required for a small community system from the Regional Water Quality Control Board. The septic and leachfield system at the Grape Solar Project will be designed in accordance with the Kings County Plumbing Code and the Local Area Management Program (LAMP) as approved by the State Water Resources Control Board (SWRCB), and would subject to the approval of the Kings County Community Development Agency and Environmental Health Services Division, which would ensure compliance with all applicable standards in order to avoid impacts to groundwater quality (Kings County 2016). During construction of the Grape Solar Project, sanitary needs will be provided by portable chemical toilets which will be serviced by an outside contractor as needed. Therefore, the Grape Solar Project will meet waste discharge requirements and the impact would be *less than significant*.

Stormwater Standards – No Impact: The Central Valley Regional Water Quality Control Board has not established numeric standards for surface water runoff quality; therefore, no surface water quality standards apply to the Grape Solar Project. (See following paragraphs for detailed discussions of surface water quality.)

Substantially Degrade Surface or Ground Water Quality?

Less-than-Significant Impact with Mitigation Incorporated. During the construction and decommissioning phases, there is a potential for discharges of hazardous materials that could adversely affect the quality of surface water or groundwater. Spills or leaks from heavy equipment and machinery can result in oil and grease contamination of stormwater. Staging areas and building sites can be the source of pollution due to paints, solvents, cleaning agents, and metals contained in the surface of equipment and materials. Gross pollutants such as trash, debris, and organic matter are additional potential pollutants associated with the construction and decommissioning phases of the project. The potential for discharges of hazardous materials to degrade water quality during the construction and decommissioning phases of the project represents a potentially significant impact.

The potential water quality impacts resulting from discharges of hazardous materials during construction and decommissioning would be reduced to less-than-significant levels through implementation of Mitigation Measure HYD-1: Stormwater Quality Protection, as set forth under item 'c' below.

***Mitigation Measure*: Implement MM HYD-1: Stormwater Protection Measures.**

Under Mitigation Measure HYD-1, the measures to prevent hazardous contamination during the construction and decommissioning phases will be specified in the Storm Water Pollution Prevention

Plans (SWPPPs) required to be implemented under the mitigation measure. (The project is anticipated to require two SWPPPs, one to be implemented during construction and one to be implemented during decommissioning.) The project SWPPPs will include construction and decommissioning phase housekeeping measures for control of contaminants such as petroleum products, paints and solvents, detergents, fertilizers, and pesticides, as well as vehicle and equipment fueling and maintenance practices, and waste management and disposal control practices, among other things. The first SWPPP would also include housekeeping measures to be followed during project operations. In addition, the solar facility would be required to implement a Hazardous Materials Business Plan (HMBP) as specified in Mitigation Measure HAZ-1, which would ensure the proper handling and storage of hazardous materials during project operation. Additionally, the use, storage, transport, and disposal of hazardous materials and waste would be required to conform to existing laws and regulations (see Section *4.9. Hazards and Hazardous Materials* for detailed discussion.)

With the implementation of Mitigation Measures HYD-1, particularly the hazardous materials provisions of the required SWPPPs, the potential for impacts to surface and groundwater quality from hazardous materials releases during project construction, operation, and decommissioning of the Grape Solar Project would be *less than significant*.

b) Would the project decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impact sustainable groundwater management of the basin?

Less-than-Significant Impact. The Grape Solar Project would require water supplies during construction, operation, and decommissioning, as discussed in turn below.

Project Construction

During the grading and construction phases, water would be regularly applied to exposed soils and internal access driveways for dust suppression. During earthwork, water would also be required in soil conditioning for optimum moisture content. As discussed in the Section *2.2. Project Description*, it is estimated that the 250 MW solar project will require a total of 352 acre-feet of water during its 14-month construction period. It is anticipated that water for construction will be obtained from the existing agricultural well located nearby.

Current groundwater pumping in the area varies substantially from year to year depending on availability of surface water deliveries of Central Valley Project (CVP) water delivered through the Westlands Water District (WWD). During years when WWD receives most of its CVP water allocation, groundwater provides a minor portion of irrigation requirements. During years of severe drought, like 2013 through 2016, groundwater pumping increases substantially to make up for shortfalls of surface water deliveries.

In 2014, the California Legislature passed the Sustainable Groundwater Management Act (SGMA) which requires that all medium to critically overdrafted subbasins identified by the California Department of Water Resources (DWR) be managed by a groundwater sustainability agency (GSA). The Grape Solar Project is located in the Westside Subbasin. As the primary water purveyor and local agency within the Westside Subbasin, Westlands Water District is the designated GSA for the

Subbasin. DWR designated the Westside Subbasin as a critically overdrafted basin which required WWD to prepare a Groundwater Sustainability Plan by January 31, 2020. On January 8, 2020, the WWD Board of Directors adopted the Groundwater Sustainability Plan (GSP) for the 622,215-acre Westside Subbasin (which includes WWD's entire 614,700-acre service area). The GSP determined that the current safe yield for the Subbasin is 270,000 acre-feet per year prior to management actions being implemented (DWR 2020a, p. ES-6). To manage groundwater during the initial years of GSP implementation, the GSA has established an interim allocation of groundwater extraction. The groundwater allocation framework is intended to manage demand by equally distributing the total annual pumping from the Subbasin on the basis of land acreage overlying the Subbasin. The groundwater allocation program includes a "transition period" from 2022 to 2030, in which a uniform annual allocation is initially established at 1.3 acre-feet per acre, which is to be subsequently reduced each year by 0.1 AF per acre until 2030 when the allocation would reach the long-term limit 0.5 AF per acre per year. The groundwater will be distributed based on per-acre land ownership for all qualifying lands (DWR 2020a, p. ES-13). For purposes of this analysis, the groundwater supply available to the Grape Solar Project is conservatively assumed to be the long-term allocation of 0.5 AF per acre per year.

Grape Solar Project will be constructed over 14-month period, resulting in water demand of 176 acre-feet per year (afy), or 0.1 afy/acre (assuming the construction period is evenly divided between 2022 and 2023). This volume of groundwater pumping is well below the GSA's long-term groundwater extraction allocation of 0.5 AF per acre per year. Therefore, the groundwater pumped during project construction would not decrease groundwater supplies or contribute to the lowering of the local groundwater table level.

Project Operation

During project operation, non-potable water will be required for activities such as panel cleaning, washing or rinsing equipment, and other operational uses. As described in Section *2.2. Project Description*, the combined water usage from all operational activities is estimated to total 32.21 acre-feet annually over the 1,759-acre project site.

Operational water supplies will be provided by Westlands Water District (WWD) through its existing system of lateral pipelines for conveyance of imported surface water. Under the WWD's Municipal and Industrial (M&I) Regulations, an applicant may apply for and receive up to 5 acre-feet for water for M&I use. The District has estimated that solar development requires 3 to 5 acre-feet per year per 160 acres. In order to provide for solar projects greater than 160-acres in size, the WWD has established an exception to the M&I limit whereby solar facilities would be eligible to receive up to 5 acre-feet per year for each 160 acres developed. The estimated 32.21 acre-feet per year (afy) of operational water consumption for the project is equivalent to 0.018 afy per acre or 2.93 afy per quarter section (160 acres). Since this is well within the 5.0 afy per acre of imported surface water per quarter section that the project would be eligible to receive under WWD's M&I rules, there will be no need to augment surface water supplies with groundwater for project operations.

Temporary periodic curtailment of surface water supplies to meet the project's operational demands is not currently foreseen. Even during extreme drought years when imported water may not be available from the Central Valley Project, the WWD will typically purchase surface water on the open market in order to provide uninterrupted supply for its M&I customers. Alternatively, the relatively small volumes of untreated water that would be required for project operations could be obtained from an existing agricultural well located nearby. The 32.21 afy of operational water demand would be equivalent to 0.018 afy/acre, or 3.6 percent of the GSA's long-term groundwater extraction allocation of 0.5 afy per acre. This very low level of temporary demand for groundwater would not decrease groundwater supplies or contribute to the lowering of the local groundwater table level. In the unlikely event that no groundwater sources are available, the relatively small volumes of untreated water required could be purchased from an alternative source, such as the City of Lemoore, and trucked to the site.

The Grape Solar Project would result in less than one percent increase in impervious surface coverage of the project site with hard surfaces created at the O&M facility, substation, and battery storage facility, and at the equipment pads which would be widely dispersed throughout the project site. The solar panels themselves would be elevated above ground level with permeable soils and vegetation beneath. Thus the solar arrays would not displace runoff, and rainwater falling from edges of the panels would spread to vegetated areas beneath the arrays and percolate into the ground. The minimal addition of impervious surfaces would not prevent rainfall from percolating into the underlying soils. The runoff from these surfaces would be displaced to immediately adjacent vegetated areas and would be readily absorbed into the ground. Therefore, project operation would not interfere with groundwater recharge at the project site.

Project Decommissioning

Untreated water would be required during decommissioning, although the volume of water required is expected to be less than required during the construction phase. Since vegetative cover would be maintained on the site during deconstruction, there would be relatively little exposed soil that would require watering for dust suppression. Similarly, water would not be required for soil conditioning during grading. The source of water during decommissioning is expected to be from an existing agricultural well located nearby. The total groundwater pumped during decommissioning is expected to be substantially less than the estimated 351 acre-feet required during project construction. Under a conservative assumption that water demand during decommissioning would be same as during construction, and that decommissioning would be completed in one year or less, this would represent a water demand of about 0.2 AF per acre over the 1,759-acre project site (or 0.1 AF per acre per year). This would be far less than the GSA's long-term extraction allocation of 0.5 AF per acre per year; therefore, the project water demands during decommissioning would not result in overpumping or exceedance of the safe yield of the groundwater basin. In summary, the groundwater pumped during decommissioning would not decrease groundwater supplies or contribute to the lowering of the local groundwater table level.

In summary, the Grape Solar Project would not decrease groundwater supplies or interfere substantially with groundwater recharge, and thus the impact of the Grape Solar Project on the sustainable groundwater management of the basin would be *less than significant*.

c) *Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or through the addition of impervious surfaces, in a manner which would?*

i. Result in substantial erosion or siltation on- or off-site?

Less-than-Significant Impact with Mitigation Incorporated. There are no natural drainage courses on the Grape Solar Project site or in the vicinity, with the nearest natural water body being the Kings River located approximately 2 miles east. There are several irrigation canals that run through or adjacent to the project site, including a large canal along the 25^{th} Avenue alignment, two smaller canals that traverse the project site from north to south, and the Empire Westside Main Canal which runs adjacent to the eastern site boundary. The project includes no proposal to substantially modify the ground contours or surface drainage patterns on the site, or alter the existing irrigation canals that run through and adjacent to the project site.

The installation of the project solar facilities would involve site clearing, rough grading, soil compaction, establishment of temporary construction staging areas, construction of internal access driveways, and trenching for buried electrical conduits. Since the existing site topography is virtually level, only minor grading would be required for the project. Ground preparation would include tilling and grading to smooth out existing agricultural furrows, followed by compaction with rollers. Finished grades would be designed to provide for positive site drainage. As discussed in the Section *2.2. Project Description*, site clearing and soil preparation would occur incrementally and would commence in a given area only when it is needed for the next construction phase. Vegetative cover would be retained as long as possible to minimize exposed soils and reduce potential for erosion and wind-blown dust. Once vegetation is removed, the exposed and disturbed soil would be susceptible to erosion from wind and rain. During the decommissioning phase, the soil on the project site would again be subject to exposure and disturbance resulting in potential erosion by water and wind, although existing vegetation would not be removed. Unless mitigated, the potential for erosion and siltation impacts would be potentially significant.

In order to mitigate the potential erosion and sedimentation impacts associated with project construction and decommissioning to less-than-significant levels, the following mitigation measure shall be implemented in conjunction with the Grape Solar Project:

> ***Mitigation Measure HYD-1: Stormwater Quality Protection.*** *Prior to construction grading and prior to the decommissioning, the applicant shall be required to file a "Notice of Intent" (NOI) with the SWRCB to comply with the General Construction Permit and prepare a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP for each project phase shall be prepared by a licensed engineer and shall detail the treatment measures and best management practices (BMPs) to control pollutants that shall be implemented and complied with during the construction and post-construction phases of solar development. The SWPPP(s) required for decommissioning shall specify BMPs to be implemented during that final project phase. The construction contracts for each project phase, and for the decommissioning phase, shall include the requirement to implement the BMPs in accordance with the SWPPPs. The SWPPPs will specify such practices as: designation of restricted-entry zones, sediment tracking control measures (e.g., crushed stone and/or riffle metal plate at construction entrance), truck washdown areas, diversion of runoff away from disturbed areas, protective measures for*

sensitive areas, outlet protection, application of mulch for soil stabilization during construction, and provision for revegetation upon completion of construction within a given area. The SWPPPs will also prescribe treatment measures to trap sediment once it has been mobilized, such as straw bale barriers, straw mulching, fiber rolls and wattles, silt fencing, and siltation or sediment ponds. Upon completion of each project phase, the finished grades beneath and around the finished rows of solar panels will be revegetated with a native seed mix. The reestablished vegetated cover would stabilize the soils and minimize the potential for post-construction erosion. The construction contracts for each project phase, and for the decommissioning phase, will include the requirement to implement the BMPs in accordance with the SWPPPs, and proper implementation of the specified BMPs is subject to inspection by the Regional Board staff.

In summary, the implementation of Mitigation Measure HYD-1 in conjunction with the Grape Solar Project would reduce the potential erosion and siltation impacts resulting from the project to *less-than-significant* levels.

ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

Less-than-Significant Impact. The Grape Solar Project would result in less than one percent increase in impervious surface coverage of the site, which in turn would result in a negligible increase in localized runoff. The impervious surfaces created by the project would include the concrete pads for inverters and transformers, and the footings and pads for the on-site O&M building, substation, battery storage facility, and the small paved parking area in the operations yard. The maintenance driveways of the project would be surfaced with permeable gravel to allow continued percolation of rainfall into the underlying soil. As shown in Table 1 in Section *2.2. Project Description*, the project would cover 0.2 percent of the site with impervious surfaces, leaving 99.8 percent of the site permeable for percolation of runoff, including 90.9 percent in vegetative cover and 8.9 percent in permeable gravel driveways.

Since the impervious surfaces of the dispersed equipment pads and small parking area would prevent percolation into previously permeable underlying soils, the slight volume of runoff from these facilities would be displaced to immediately adjacent vegetated areas where this very small amount of runoff would be readily absorbed into the ground. The solar panels themselves would be elevated above ground level with permeable vegetation covered soils beneath. Thus the solar arrays would not displace runoff, and rainwater falling from edges of the panels would spread to vegetated areas beneath the arrays and percolate into the ground.

The terrain of the project site is virtually flat, with a maximum gradient of 0.2 percent across the site. Under current conditions, rainfall percolates into the soil with little or no runoff leaving the site. The Grape Solar Project would result in no substantial modification of existing site grades. During normal rain events, runoff from impervious surfaces would be absorbed by the adjacent vegetated ground and percolate into the soil. During more intense or prolonged storm events, the ground would become saturated and relatively minor volumes of stormwater may temporarily pond on the surface and gradually percolate into the ground, as occurs under existing conditions. Due to the virtually level ground conditions, and the complete coverage of the site with pervious soils to absorb rainwater, the conditions that would allow for stormwater to be mobilized and concentrated in sustained runoff flows do not exist on the site under pre-project conditions. The very minor introduction of small areas of impervious surfaces distributed throughout the site would not have a discernable effect on drainage runoff patterns on the site, and would not result in flooding on or off the site.

In summary, the project's minimal alteration of the virtually level site terrain, and the very minor project coverage of the site with impervious surfaces, would have a negligible effect on runoff patterns on the site. Therefore, drainage and flooding impacts associated with the Grape Solar Project would be *less than significant*.

iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

Less-than-Significant Impact. As discussed in item 'c.ii' above, the addition of 0.2 percent impervious coverage at the Grape Solar Project site would have a negligible effect on runoff patterns at the site, and is unlikely to generate runoff flows that would leave the site. The irrigation canals that run through and adjacent to the site were designed and constructed to convey large volumes of irrigation water through the area. Under existing conditions, these canals capture rainwater that incidentally enters the canals from the adjacent fields. There is no existing system of drainage ditches that conveys water from agricultural fields to these canals. The Grape Solar Project does not require an internal stormwater drainage system since rainfall would percolate directly into the ground at the site. Given that the impervious surfaces introduced by the project would be located in the site interior, away from the adjacent irrigation canals, there will be little if any additional runoff generated by the project at would incidentally enter these canals. Therefore, these canals would continue to have sufficient capacity to accept the minor flows that might leave the project site during a major storm event.

Regarding the issue of polluted runoff, the project would not introduce substantial sources of stormwater pollutants, such as oil, grease, metals, and debris typically associated with stormwater pollution generated on urban streets and parking lots. The very minor leaks of oil or lubricants from maintenance vehicles and equipment used at the project would not be substantially different in nature or quantity from those expected from farm machinery used at the site under pre-project conditions. Therefore, the impacts associated with the potential for additional sources of polluted runoff to be generated by the project would be less than significant.

In summary, the impact associated with the potential for the Grape Solar Project to create or contribute runoff water which would exceed the capacity of stormwater drainage systems or result in substantial additional sources of polluted runoff would be *less than significant*.

iv. Impede or redirect flood flows?

No Impact. The Grape Solar Project is not located within the flood zones for the 100-year or 500-year events, as mapped by the Federal Emergency Management Agency (FEMA). FEMA's Flood Insurance Rate Map (FIRM) covering the project site indicates that the project site is entirely located within Zone X, which applies to areas "[d]etermined to be outside the 0.2% annual chance (500-year) floodplain" (FEMA 2009a). There is a very large area of mapped floodplain associated with the Tulare Dry Lake to the southeast of the project site. The nearest edge of Tulare Lake's 100-year floodplain generally follows the alignment of SR-41 and is approximately 0.4 miles southeast of the project site at its nearest point (FEMA 2009b).

The California Department of Water Resources (DWR) administers the Awareness Floodplain Mapping Program, the purpose of which is to identify flood hazard areas for areas that are not mapped under FEMA's National Flood Insurance Program (NFIP), and to provide the community and residents an additional tool in understanding potential flood hazards currently not mapped as a regulated floodplain. In DWR's mapping, floodplains are shown simply as flood prone areas without specific depths and other flood hazard data. The nearest DWR flood zone is mapped as a long strip of land running parallel to and west of the California Aqueduct, and is located approximately 7.5 miles west of the project site at its nearest point (DWR 2020b).

In summary, no portion of the project site is subject to flooding during the 100-year or 500-year events. Since the Grape Solar Project is not subject to potential flooding hazard, the project would have *no impact* with respect to impeding or redirecting flood flows.

d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

No Impact. Within the San Joaquin Valley, there are large areas of land that are subject to inundation flooding in the event of a dam failure at a reservoir in the region. Portions of Kings County located to the east and northeast of the Grape Solar Project site are subject to potential inundation in the event of the failure of dams located in the Sierra Nevada. The Pine Flat Dam, located upstream on the Kings River, and the Terminus Dam on the Kaweah River, are the only dams in the region which, if breached, might cause flooding of significance within the affected areas. The mapped inundation areas are shown on Figure HS-7 in the Health and Safety Element of the 2035 Kings County General Plan, and are described below.

The failure of the Pine Flat Dam would result in a potential inundation area that could extend to within approximately 0.5 miles east of the project site. A failure of the Terminus Dam on the Kaweah River could inundate an area extending as far southwest as the intersection of Kansas and 10th Avenues located south of the City of Hanford, approximately 14 miles northeast of the project site (Kings County 2010e). In summary, the Grape Solar Project site is not located within the mapped inundation areas for any of the reservoirs in the region, and therefore would not be subject to risk of flooding in the unlikely event of dam failure. There are no other impoundments or diked areas nearby, and therefore the project site would not be subject to risk of flooding due to levee failure.

With respect to tsunamis, the Grape Solar Project site would not be subject to inundation from potential tsunamis generated in the Pacific Ocean due to its inland location more than 70 miles from the coast, and given its elevation at over 200 feet above sea mean level.

Seiches are seismically-induced waves in an enclosed body of water such as a lake or reservoir. Severe seismic shaking can cause impounded water to spill beyond the banks and inundate surrounding lands. There are no open bodies of water in the project vicinity with the exception of the wastewater settling ponds for NAS Lemoore, which are located 5.5 miles north of the Grape Solar project site. These ponds are relatively shallow, and in the unlikely event of seismic shaking severe enough to result in overspill, the spilled water would tend to flow down-gradient toward the Kings River to the east. The Grape Solar Project site is located up-gradient or cross-gradient relative to the settling ponds, and given the distance to the ponds, there is little or no potential that spilled water from the ponds would reach the project site.

In summary, the Grape Solar Project would not be subject to flooding due to dam failure, tsunami, or seiche, and thus would not be at risk of release of pollutants from such potential inundation. Thus there would be *no impact* in terms of hazards associated with such events.

e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

No Impact. The Grape Solar Project site is located within the Tulare Lake Hydrologic Basin Planning Area, for which the Basin Plan was revised most recently in July 2016. The Basin Plan provides for the protection of beneficial uses of surface waters including agricultural, industrial, recreational, biological, and groundwater recharge uses. The project site does not contain any natural hydrologic features and is not hydrologically connected to a natural water feature. The project would not affect the existing surface water features (such as canals), and groundwater recharge would not be affected due to the very small amount of impervious surfaces created by the project. As noted above, the project would be required to adhere to NPDES storm water runoff control requirements during construction and operation. This includes preparation and implementation of SWPPPs in order to control stormwater runoff and minimize erosion, siltation, and contamination by hazardous materials during construction, operation, and decommissioning, as required in Mitigation Measure HYD-1. The project septic system would be designed, constructed and operated in compliance with the Local Agency Onsite Wastewater Treatment System (“OWTS”) Management Program (“LAMP”) and the Kings County septic design standards, which would prevent groundwater impacts from wastewater disposal. The Grape Solar Project would not include any other waste discharges that could conflict with the Basin Plan.

The Sustainable Groundwater Management Act (SGMA), passed in 2014, requires that all medium to critically overdrafted subbasins identified by the California Department of Water Resources (DWR) be managed by a groundwater sustainability agency (GSA). The GSA is responsible for locally managing the groundwater subbasin through the development and implementation a Groundwater Sustainability Plan (GSP). Medium and high priority groundwater subbasins are required to submit their GSP by 2022 and critically overdrafted subbasin are required to submit their GSP by 2020. As the primary water purveyor and local agency within the Westside Subbasin, Westlands Water District is the designated GSA for the Subbasin. DWR designated the Westside Subbasin as a critically overdrafted basin which required WWD to prepare a Groundwater Sustainability Plan by January 31, 2020. Preparation of the GSA for Westside Subbasin commenced in 2016, and the final GSP was adopted by the WWD Board of Directors on January 8, 2020 (DWR 2020a). The GSP determined that the current safe yield for the Subbasin is 270,000 acre-feet per year across the 622,215-acre Subbasin area (which includes WWD’s entire 614,700-acre service area). The GSA has prepared a groundwater allocation framework to manage demand by equally distributing the total annual pumping from the Subbasin on the basis of land acreage overlying the Subbasin. The groundwater allocation program includes a “transition period” from 2022 to 2030, in which a uniform annual allocation is initially established at 1.3 acre-feet per acre and then reduced each year by 0.1 AF per acre until 2030 when the allocation would reach 0.5 AF per acre. The groundwater will be distributed based on per-acre land ownership for all qualifying lands. For purposes of this analysis, the groundwater supply available to the Cherry Solar Project is conservatively assumed to be the long-term allocation of 0.5 AF per acre per year.

As discussed above, the Grape Solar Project would require 0.1 AF per acre per year during project construction, and 0.02 AF per acre per year during project operation, each of which is well below the GSA's long-term groundwater extraction limit of 0.5 AF per acre per year. Thus the Grape Solar Project would not conflict with this groundwater management plan.

In summary, the Grape Solar Project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan and thus would have *no impact* in this regard.

REFERENCES – HYDROLOGY AND WATER QUALITY

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4.11. LAND USE AND PLANNING

Would the project:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant	No Impact
a) Physically divide an established community?	☐	☐	☐	■
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	■

Setting

Existing Land Use

The Grape Solar Project site consists of agricultural fields with related features such as irrigation canals, water pipelines, power lines, and unimproved agricultural roads. In recent years, the site has typically been cultivated for winter wheat during the wet season and left fallow during the dry season.

The 70-kV Henrietta to Tulare Lake sub-transmission line runs through the center of the site from north to south along the 25th Avenue alignment. A large agricultural irrigation canal also runs through the center of the site alongside the 25th Avenue alignment, and another large canal (the Empire Westside Main Canal) runs parallel to the east site boundary at varying distances of 50 to 400 feet east of the site. Two smaller irrigation canals run through the eastern portion of the project site in a north-south direction.

The lands surrounding the Grape Solar project site consist mainly of agricultural lands along with related irrigation canals, ditches, wells, pump stations, power lines, and farm roads (see Figure 2 – Project Vicinity). Other land uses in project vicinity consist of farming operations centers and agricultural dwellings. The nearest habitable structures include the following: 1) Three ranch complexes (with a total of eight dwellings) located 0.5 miles east, 1.0 mile southeast, and 1.5 miles northeast of the project site along the east side of SR-41; 2) Five dispersed agricultural residences located 2.2 to 3.9 miles northeast of the project site along 22nd Avenue; 3) The Shannon Ranch complex (including 20 dwellings) located 2.5 miles northwest; and 4) The Stone Land Company Ranch (with 2 dwellings) located 3.4 miles west along Nevada Avenue. The Omaha Ranch, a dairy feed lot located 2 miles south of the project site, includes no habitable structures.

The nearest population centers include the community of Stratford located 3.5 miles east, the City of Lemoore located 10 miles northeast, the Santa Rosa Rancheria located 8.5 miles northeast, the City of Huron located 9.5 miles west, and the community of Kettleman City located 9 miles south. Naval Air Station Lemoore (NASL), and its associated base housing, is located 6.5 miles north of the project site. The Grape Solar project site partially located within an NASL Arrival Flight Track, and is within the Military Influence Area for NASL.

There are several completed solar generating facilities in the project vicinity, including: the Kent South/Orion/Mustang, Westside Solar (Phase 1), American Kings, and Mustang 2 facilities, all of which are located between 2.5 to 6.5 miles north, and the Kettleman Solar facility located 5.5 miles south. In addition, there are several approved solar projects in the vicinity to the north, including the Slate, Westside Solar (Phase 2), Aquamarine, Solar Blue, and Chestnut Solar Projects, all of which are located between 0 and 7 miles north. It is anticipated that all of these solar projects well be completed by the time the Grape Solar Project begins construction.

Planning Context

2035 Kings County General Plan

The "Land Use Map" of the *2035 Kings County General Plan Land Use Element* shows the land use designation of the eastern-most 536 acres of the Grape Solar Project site as "Exclusive Agriculture – 40 acre," and the remaining 1,223 acres of the site as "General Agriculture – 40 acre." The General Agriculture designation generally applies to areas south of Kansas Avenue, and the Exclusive Agriculture designation applies to areas within the flight paths of the Naval Air Station Lemoore. Both of these land use designations fall under the broader General Plan category of Agricultural Open Space. In addition to a range of agricultural uses and ancillary activities, the General Plan allows solar voltaic generating facilities within the Agricultural Open Space areas of the County, as set forth in LU Policy B7.1.3. Energy producing facilities are allowed in the Exclusive Agriculture zone where such facilities would not create a hazard for aircraft, as set forth in RC Policy A1.2.4.

Kings County Development Code

As designated in the Kings County Zoning Plan, the entire Grape Solar site is zoned "AG-40 General Agricultural-40" (Kings County 1964). As provided in Article 4 of the Kings County Development Code, commercial solar photovoltaic electrical generating facilities are permitted in this zoning district subject to a granting of a Conditional Use Permit by the Kings County Planning Commission (Kings County 2020).

Article 11, Section 1112(B)(2) of the Kings County Development Code requires that commercial-scale solar photovoltaic electrical facilities conform with specified standards. Most of these standards relate to agricultural land. The required standards, and the project's conformity with the standards, are addressed in detail in Section *4.2. Agriculture and Forestry Resources*.

NAS Lemoore Joint Land Use Study

The NAS Lemoore Joint Land Use Study (JLUS) involved a multi-agency effort managed by the Department of Defense (DOD) for cooperative land use planning between NAS Lemoore and adjacent communities to provide for compatibility between future community growth and the training and operational missions of the military installation. Since DOD has no regulatory authority for local land use outside the boundaries of the naval air station, the JLUS also includes planning recommendations for consideration by local jurisdictions (JLUSPC 2011).

The noise contour mapping prepared for the JLUS shows bands of noise contours exceeding 60 dB CNEL which correspond closely to the flight corridors surrounding the airfield (JLUSPC 2011). The aircraft noise corridor is reflected in the *2035 Kings County General Plan* "Land Use Map," which designates lands within a 3-mile buffer zone from the installation, plus the noise-impacted areas (exceeding 70 dB CNEL) south of the buffer zone, as "Exclusive Agriculture – 40-acre minimum (AX)." The intent of this land use designation is to provide a safety buffer zone around the base by limiting and discouraging intensive agricultural and structure-based land uses that may pose increased risks to inhabitants and base operations (Kings County 2010a). The JLUS also identifies height obstruction limits near NAS Lemoore, with the limits in a given area depending on its location relative to landing approach zones. The entire Grape Solar Project site is mapped as lying just outside and south of the southern limits of Height Restriction Zone "D" which specifies height limits for ground structures of 500 feet above the ground surface (JLUSPC 2011).

Solar generating facilities are specifically addressed in JLUS Recommendation 17, which states: "Establish Minimum Technical Standards for Renewable Energy Facilities Located within NASL Overlay Zones I, II, and III (JLUSPC 2011, p. 2-51). The concern is with "solar farms creating excessive glare from the reflection of the sun" (JLUSPC 2011, p. 2-9). The main concern is with concentrating solar thermal technologies such as lenses or mirrors on a large scale with their reflective characteristics and tall tower collectors. However, "if there is no central collection tower, the new solar panels can be made non-reflective and arrays could be installed to not cause any height or reflective issues" (JLUSPC 2011, p. 2-12).

Environmental Evaluation

a) Would the project physically divide an established community?

<u>No Impact</u>. The Grape Solar Project site is not located within or near an established community, so the proposed solar facilities would not physically divide any such community. As such, there is *no impact* in this regard

b) Would the project cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

<u>No Impact</u>. The potential for the Grape Solar Project to conflict with the Kings County 2035 General Plan and Kings County Development Code, as well as the applicable land use recommendations of the NAS Lemoore Joint Land Use Study (JLUS), is discussed below.

Kings County

<u>General Plan</u>

The 2035 Kings County General Plan designates the eastern-most 538 acres of the Grape Solar Project site as "Exclusive Agriculture – 40 acre," and the remaining 1,223 acres of the site as "General Agriculture – 40 acre." These land use designations fall under the broader General Plan category of Agricultural Open Space which permits a range of agricultural uses and ancillary activities, as well as solar voltaic generating facilities. Therefore, the planned installation of solar PV generating facilities within the project site would be consistent with the General Plan Land Use Map.

Zoning

As designated in the Kings County Zoning Plan, the entire Grape Solar Project site is currently zoned "AG-40 General Agricultural-40." As provided in Article 4 of the Kings County Development Code, utility-scale photovoltaic electricity generation is a conditionally permitted use in this agricultural zoning district. Therefore, the Grape Solar Project would be consistent with the development code upon the granting of the subject Conditional Use Permit for the project.

Section 1112.B.2 of the Kings County Development Code establishes specific requirements that must be satisfied for the granting of a Conditional Use Permit for a solar generating facility. Since most of the requirements pertain to agriculture, the project's ability to meet each of the requirements is addressed in Section *4.2. Agriculture and Forestry Resources*. In summary, all of the applicable requirements in Section 1112.B.2 would be satisfied by the Grape Solar Project.

NAS Lemoore

Safety and Noise

The mapping prepared for the JLUS shows that the project site lies within the military aircraft flight path and that the eastern one-third of the site is subject to noise levels greater than 60 dBA CNEL. As discussed above, the County General Plan 'AX – Exclusive Agriculture' designation was specifically created to reflect the NAS Lemoore landing approach flight patterns and the corresponding high noise conditions on those lands. While the intent of the AX land use designation is to limit intensive land uses that may pose increased risks to inhabitants and base operations, low intensity solar PV generating facilities are not noise sensitive land uses and thus would not be incompatible with relatively higher risks and noise levels from overhead flight operations. The noise from military aircraft overflights is addressed in detail in Section *4.13. Noise*.

Height Obstruction Limits

The JLUS also identifies height obstruction limits near NAS Lemoore, with the limits in a given area depending on its location relative to landing approach zones. The entire Grape Solar Project site is mapped as lying 0.5 miles to the south of Height Restriction Zone "D" which has a height limit for ground structures of 500 feet above the ground surface (JLUSPC 2011). The tallest structures within the project would consist of structural elements associated with the on-site substation which would be as high as 75 feet. Most project structures would consist of solar arrays and inverter pads which would be up to 8 feet tall, as would the battery energy storage units, and the meteorological stations would be approximately 11 feet high. The monopoles for the gen-tie line running along 25 Avenue within the project site would be 100 feet tall, while the monopole running along Nevada Avenue would range in height from 125 to 160 feet. Thus, even if the Grape Solar Project site was located within a Height Restriction Zone, the tallest structural features would be well within the 500-foot height limit and would not create operational obstructions.

Reflected Glare

The JLUS addresses concerns with aviation hazards from reflection and glare. Solar facilities are mentioned specifically for their potential to produce reflective surfaces, but the JLUS acknowledges that the main concern is with highly reflective mirrors used in concentrating solar thermal facilities. The JLUS concludes that "if there is no central collection tower, the new solar panels can be made non-reflective and arrays could be installed to not cause any height or reflective issues" (JLUSPC

2011, p. 2-12). Indeed, solar PV facilities employ glass panels that are designed to maximize absorption and minimize reflection to increase electricity production efficiency. To limit reflection, solar PV panels are constructed of dark, light-absorbing materials, and are given an anti-reflective coating or textured surface. With the addition of the anti-reflective coating or treatment, the reflectivity can be reduced to less than 4 percent of incoming sunlight. Since the solar panels would have low reflective intensity and would be covered with anti-reflective coating, any resulting glare effects would not be so bright as to disrupt aircraft operations in the area.

In this context, it is noted that a glint and glare study using the Sandia Laboratory's Solar Glare Analysis Tool (SGHAT) was prepared for the nearby Mustang Two Solar Project MND in August 2016. In the analysis, impacts from solar glare were given three ranks, as follows: 1) potential for permanent eye damage; 2) potential for temporary after-image (a lingering image of the glare in the field of view); and 3) low potential for temporary after-image. Results from the analysis indicated that pilots flying over and near the solar facility would experience a low potential for a temporary after-image, and the potential would be limited to early morning from approximately April through September. The low potential for temporary after-image level is generally considered to be safe for pilots (Kings County 2017). The results of this glint and glare analysis are considered to be applicable to the Grape Solar Project, which is located 2.5 miles south of the Mustang Two Solar Project site and is partially located within the same flight approach/departure zone. Therefore, it is concluded that the solar PV panels to be installed within at the Grape Solar Project would not pose a potential hazard to aircraft operations at NAS Lemoore due to reflected glare (see Section *4.9. Hazards and Hazardous Materials* for further discussion of reflected glare).

In summary, the Grape Solar Project would be consistent with the applicable provisions of the Kings County 2035 General Plan and the County Development Code, and would also be consistent with the local recommendations of the NAS Lemoore Joint Land Use Study. Therefore, the Grape Solar Project would result in *no impact* with respect to potential conflict with any land use plan, policy, or regulation of an agency adopted for the purpose of avoiding or mitigating an environmental effect.

REFERENCES – LAND USE AND PLANNING

JLUSPC 2011	Naval Air Station Lemoore Joint Land Use Study Policy Committee, 2011. *NAS Lemoore Joint Land Use Study – Final Release*. August 30. https://www.kingscog.org/jlus_docs#B93D5C3D-9848-4BBF-8A50-E7769AD28E68
Kings County 1964	County of Kings. 1964. *Zoning Plan – County of Kings California*. Adopted April 7, 1964. [Available for review at Kings County Community Development Agency.]
Kings County 1996	County of Kings. 1996. *Kings County Right to Farm Ordinance*. Kings County Code of Ordinances, Sections 14-38. As amended by Ordinance No. 546.1, effective May 30, 1996. Notice and Disclosure Form available at http://www.countyofkings.com/home/showdocument?id=4012

Kings County 2010a	County of Kings. 2010. *2035 Kings County General Plan – Land Use Element*. Adopted January 26, 2010. http://www.countyofkings.com/home/showdocument?id=3110
Kings County 2010b	County of Kings. 2010. *2035 Kings County General Plan – Resource Conservation Element*. Adopted January 26, 2010. http://www.countyofkings.com/home/showdocument?id=3112
Kings County 2017	County of Kings. 2017. *RE Mustang Two Solar Project – Draft Initial Study and Mitigated Negative Declaration.* October. [Available for review at the Kings County Community Development Agency.]
Kings County 2019	County of Kings. 2019. *Kings County Code of Ordinances,* as amended through December 17, 2019. https://www.municode.com/library/ca/kings_county/codes/code_of_ordinances
Kings County 2020	Kings County. 2020. *Kings County Development Code. Kings County Code of Ordinances, Appendix A - Ordinance No. 668.15*. Dated July 14, 2020; Effective August 14, 2020. https://www.countyofkings.com/departments/community-development-agency/information/zoning-ordinance

4.12. MINERAL RESOURCES

Would the project:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant	No Impact
a) 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) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	□	□	□	■

Environmental Evaluation

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?

No Impact. Southern Kings County and western Fresno County include several oil and natural gas fields. The nearest oil field is the abandoned Westhaven oil field located approximately 3.5 miles northwest of the project site in Fresno County. There are no oil or natural gas wells (operating or abandoned) on the Grape Solar Project site or its immediate vicinity (i.e., within ½ mile). The nearest wells to the project site include four inactive oil wells located between 0.5 and 1.3 miles to the west, of which two are formerly productive (now idle) oil wells, one is a plugged well, and one is a dry hole. The nearest active oil fields include the Kettleman North Dome oil field, located 9 miles southwest, and the Coalinga oil fields located 12 miles west of the project site. The nearest gas field is the abandoned Dudley Ridge gas field located 14 miles south of the project site (CalGEM 2021).

Kings County includes 11 former mineral extraction sites as mapped by the California Division of Mine Reclamation, consisting mainly of former sand and gravel quarries, and also including one former gypsum mine. All of these surface mining operations have been reclaimed (CGS 2021). The General Plan Resource Conservation Element notes that a small mercury mine once operated in southwestern Kings County near Parkfield but is now closed (Kings County 2010b). The nearest active surface mining sites are in western Fresno County and consist of two large sand and gravel operations near Coalinga, located approximately 18 miles southwest and 24 miles west of the project site (DMR 2021). There are no sand and gravel deposits in the project area, in either Kings or Fresno counties, and construction of the Grape Solar Project would not result in the loss of availability of sand and gravel resources in the region.

In summary, the Grape Solar Project would have *no impact* upon availability of known mineral resources.

b) Would the project result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

No Impact. Mineral resources are addressed in the Resource Conservation Element of the 2035 Kings County General Plan. The General Plan recognizes that oil and natural gas production in the County has diminished and does not designate any areas of the County for oil and gas recovery. Similarly, the General Plan notes the low potential for surface mining in the County and does not designate any areas of the County as important aggregate or other mineral recovery sites (Kings County 2010b). The California Geologic Service (CGS) produces Mineral Land Classification (MLC) studies that identify areas of the State with potentially important mineral resources. MLC studies have not identified potentially important mineral resource areas that extend west of Hanford in Kings County (CGS 2021). Likewise the CGS has not classified any lands in Kings County as Mineral Resource Zones (MRZs) under the Surface Mining and Reclamation Act (SMARA). Therefore, the Grape Solar Project would have *no impact* with respect to loss of availability of important mineral recovery sites designated on any land use plans.

REFERENCES – MINERAL RESOURCES

CalGEM 2021	California Department of Conservation (CDOC), Geologic Energy Management Division (CalGEM). 2021. *Well Finder*. January. https://maps.conservation.ca.gov/doggr/wellfinder/#openModal/-119.89116/36.18388/12
CGS 2021	California Department of Conservation (CDOC), California Geologic Survey (CGS). 2021. *Mines Online*. January. https://maps.conservation.ca.gov/mol/index.html
DMR 2021	California Department of Conservation (CDOC), Division of Mine Reclamation (DMR). 2021. *CGS Information Warehouse: Mineral Land Classification*. January. https://maps.conservation.ca.gov/cgs/informationwarehouse/index.html?map=mlc
Kings County 2010b	County of Kings. 2010. *2035 Kings County General Plan – Resource Conservation Element*. Adopted January 26, 2010. http://www.countyofkings.com/home/showdocument?id=3112

4.13. NOISE

Would the project result in:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	■	☐
b) Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	■	☐
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	■	☐

The discussion of potential noise and vibration impacts in this section is based on the *Noise and Vibration Assessment* prepared by Illingworth & Rodkin in February 2021. The noise report, which is contained in Appendix C of this IS/MND, includes a detailed discussion on the fundamental concepts of noise and vibration, as well as definitions of acoustical terms used in the noise report and in the following discussion.

Noise Setting

The existing noise environment in the project area is typical of rural agricultural environments. The primary noise sources in the project vicinity include: 1) traffic on a County road (Nevada Avenue) and State Highway (SR-41); 2) agricultural equipment and crop dusters; and 3) occasional overflights by military aircraft from Naval Air Station Lemoore (NASL).

The Grape Solar Project site is located approximately 9.0 miles south of the airfield at NASL, and is included in the study area for the NAS Lemoore Joint Land Use Study. The project site is located within the NASL flight pattern with military aircraft noise levels ranging from <60 dBA to 70 dBA CNEL, according to the noise contour mapping contained in the NAS Lemoore Joint Land Use Study (JLUSPC 2011, p. 2-11).

There are no noise-sensitive residential receivers within 0.5 mile of the project site. The nearest residences to the project site include the following: 1) Three ranch complexes (with a total of eight dwellings) located at least 0.5 miles east, 1.0 mile southeast, and 1.5 miles northeast of the site along the east side of SR-41; 2) Five dispersed agricultural residences located 2.2 to 3.9 miles northeast of the project site along 22nd Avenue; 3) The Shannon Ranch complex (including 20 dwellings) located 2.5 miles northwest; and 4) The Stone Land Company Ranch (with 2 dwellings) located 3.4 miles west along Nevada Avenue.

A large portion of project construction traffic will travel to the project site from the east and west via Nevada Avenue. Since existing traffic volumes on Nevada Avenue are low, this roadway will be subject to the greatest relative increase in traffic noise during construction. The two dwellings at the Stone Land Company Ranch, located along the Nevada Avenue travel route, would be subject to the greatest relative increase in construction traffic noise, compared to other residential receivers in the area. In order to document conditions at the receptors in the Stone Land Company Ranch complex, a long-term noise measurement was conducted alongside Nevada Avenue at the ranch between Monday, December 14, 2015 and Tuesday, December 15, 2015. The sound level meter was placed approximately 27 feet from the center of Nevada Avenue to represent the noise exposure at residences in the immediate vicinity of the roadway. The noise measurements documented the existing daily trend in noise levels due to traffic. The day-night average noise level at this site was 67 dBA Ldn. Typical daytime hourly average noise levels were approximately 57 to 69 dBA Leq.

Environmental Evaluation

a) Would the project result in the generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Less-than-Significant Impact. Noise would be generated during the construction, operations, and decommissioning phases of the Grape Solar Project. The potential for temporary and permanent noise sources from the project to exceed applicable noise standards is discussed below for each phase of the project.

Construction Phase

During the construction phase, the two main sources of noise would be from on-site grading and construction, and from off-site traffic generation, each of which is discussed in turn below.

On-Site Construction Noise

The construction noise levels would depend on the noise generated by various pieces of construction equipment, the timing and duration of noise-generating activities, and the distance between construction noise sources and noise sensitive receptors. In accordance with the 2035 Kings County General Plan Noise Element policies, a significant noise impact would occur if construction noise levels exceed 55 dBA L_{eq}, and if they exceed the ambient noise environment by 5 dBA L_{eq} or more.

Construction noise levels would be highest during site grading, excavation, and installation of solar equipment. Hourly average noise levels generated by construction equipment associated with the project are calculated to range from 85 dBA L_{eq} to 87 dBA L_{eq} measured at a distance of 50 feet, assuming that all equipment proposed for each construction phase are operating simultaneously. Construction-generated noise levels drop off at a rate of about 6 dBA per doubling of distance between the source and receptor (I&R 2021). The nearest noise-sensitive residential land uses are located over 0.5 mile to the east. At this distance, the maximum construction noise levels reaching the nearest residences would range from 51 dBA L_{eq} to 53 dBA L_{eq}, taking into consideration the attenuation of sound with distance from the noise source. These construction-related noise levels would be below the applicable County noise standards and would be lower than ambient daytime noise levels at the nearest receptors. Therefore, project construction activities would not exceed applicable County noise standards and the impact would be *less than significant*.

Construction Traffic

The analysis of construction traffic noise used a baseline of existing Average Daily Traffic (ADT) volumes on the affected roadway segments, and added worker and truck volumes generated during project construction. It was calculated that the highest noise level increase on the affected roadways due to project construction traffic would be less than 5 dBA L_{dn}/CNEL above existing traffic noise conditions without the project at the most affected roadway – Nevada Avenue.

Under 2035 Kings County General Plan Noise Policy B1.2.1, the project would result in a significant noise impact if: a) the noise level increase is 5 dBA L_{dn}/CNEL or greater, where the pre-project noise level is less than 60 dBA L_{dn}/CNEL; or b) the noise level increase is 3 dBA L_{dn}/CNEL or greater, where the pre-project noise level between 60 and 65 dBA L_{dn}/CNEL; or c) the noise level increase is 1.5 dBA L_{dn}/CNEL or greater, where the pre-project noise level is 65 dBA L_{dn}/CNEL or greater (Kings County 2010f).

The receptors that would be most affected by project construction traffic would be the two dwellings at the Stone Land Company Ranch located 3.4 miles west of the project site along the segment of Nevada Avenue between the project entrance and Avenal Cutoff Road. Project construction traffic would result in a 57 percent increase in traffic volumes above existing conditions (2020) and a 55 percent increase in traffic volumes above baseline conditions (2022) along this segment of Nevada Avenue during the peak construction period. This would result in a 2 dBA L_{dn} increase in noise levels along this roadway segment. The two residences at the Stone Land Company Ranch are located 150 feet from the centerline on Nevada Avenue. The ambient noise level at the building facades is estimated to be 59 dBA L_{dn} under existing conditions and 60 dBA L_{dn} under baseline conditions. During peak construction, traffic noise levels at the two residences would increase to between 61 to 62 dBA L_{dn}. The 2 dBA L_{dn} increase in noise levels along this roadway segment would not exceed the 3 dBA L_{dn} noise level threshold used to assess the significance of noise impacts where pre-project noise levels are between 60 and 65 dBA L_{dn}, resulting in a less than significant impact under the County's standards.

Under current conditions, the receptors that are subject to the highest ambient noise levels are the existing dwellings at the three ranch complexes to the east, southeast, and northeast of the project site along the east side of SR-41. At the nearest ranch complex, located 0.5 miles east of the Grape Solar Project site, the nearest dwelling is 340 feet from the center of the highway. At the second ranch complex, located 1.0 miles southeast of the project site, the nearest dwelling is 610 feet from the center of the highway. At the third ranch complex, located 1.5 miles northeast of the project site, the nearest dwelling is 680 feet from the center of the highway. Based on existing traffic volumes on SR-41, the existing noise levels at the nearest sensitive receptors were calculated by Illingworth & Rodkin. Ambient traffic noise levels are estimated to be 59 dBA L_{dn} at the first ranch complex, and 53 dBA L_{dn} at the second and third ranch complexes. The southerly two ranch complexes are on the segment of SR-41 located south of Nevada Avenue, and this segment would undergo a temporary increase in daily traffic volumes of 0.4 percent due to project construction traffic. The third ranch complex, located on the segment of SR-41 located north of Nevada Avenue, would experience a temporary increase in traffic volumes of 10.0 percent due to project construction traffic. At the two southern ranch complexes, the nearest dwellings would be subject to a negligible increase (less than 0.1 dBA L_{dn}) in noise levels, which would be well below the 5 dBA L_{dn} increase that would indicate a significant impact where pre-project levels are 60 dBA L_{dn}/CNEL or lower, per the County's noise standards. The nearest dwelling in the northern-most ranch complex would experience a small increase (0.5 dBA L_{dn}) due to project construction traffic, which would be well below the 5 dBA L_{dn} increase that would indicate a significant impact where ambient levels are 60 dBA L_{dn}/CNEL or lower, per the County's noise standards.

At the Shannon Ranch complex, located 2.5 miles northwest of the project site, the segment of Avenal Cutoff Road that passes adjacent to the ranch complex would carry little or no construction-related traffic since there are far more direct routes to the project site from any point of trip origination for workers or delivery trucks. As such, the dwellings at the Shannon Ranch complex would be subject to no noise impacts due to project construction.

Along 22nd Avenue, the five agricultural dwellings dispersed along this roadway are located 2.2 to 3.9 miles northeast of the project site. The most southerly of these dwellings is located 0.38 miles northwest of the nearest travel lane on SR-41, and being the closest to the highway. Of the five dwellings on this road, this residence would be subject to the greatest potential noise increase due to project construction. It was calculated by Illingworth & Rodkin that the existing noise level at this dwelling is below 50 dBA L_{dn}. The increase in traffic noise along the nearest segment of SR-41 due to project construction traffic would be less than 0.5 dBA L_{dn} at this most affected residence on 22nd Avenue. This would be well below the 5 dBA L_{dn} increase that would indicate a significant impact where ambient levels are 60 dBA L_{dn}/CNEL or lower, per the County's noise standards. The noise increases at the other dwellings along 22nd Avenue would be lower, and also would not exceed the County's noise standards.

In summary, the construction traffic generated by the Grape Solar Project would not exceed the County's applicable noise standards at the most affected sensitive receptors. Therefore, the impact would be *less than significant*.

Operational Phase

During the operational phase of the Grape Solar Project, the two main sources of noise would be from on-site activities and from off-site traffic generation, each of which is discussed in turn below.

<u>On-Site Noise Sources</u>

Noise sources at the project site would include inverters and transformers necessary to convert the generated power to collection voltage. The 250 MW Grape Solar Project would include a total of 100 inverter/transformer pads (i.e., 1 per 2.5 MW of output). The predicted noise level attributable to one inverter/transformer is 52 dBA L_{max}/L_{eq} measured at a distance of 50 feet from the equipment. The operation the 100 inverters/transformers at the project would result in an estimated worst-case noise level of 72 dBA L_{max}/L_{eq}, measured at a distance of 50 feet (I&R 2021).

The project would include one substation, located in the southern portion of the project site near the junction of Nevada Avenue and the 25th Avenue alignment, for the purpose of stepping up voltage levels to 230-kV for transmission on the Gen-Tie Line to the Gates Substation in Fresno County. (The impacts associated with the Gen-Tie Line were addressed in the Aquamarine Solar Project and Gen-Tie Line IS/MND, which was adopted by the Kings County Planning Commission on

September 9, 2019.) Sources of audible noise within a substation include equipment such as transformers, reactors, voltage regulators, circuit breakers and other intermittent noise generators. Among these sources, transformers, reactors, and circuit breakers have the greatest potential for producing noise. The broadband sound from fans, pumps and coolers has the same character as ambient sound and tends to blend with the ambient noise. Reactors are similar to transformers in terms of audible noise and would generate noise levels of about 40 dBA L_{eq} at 200 feet (I&R 2021). The highest noise levels would be produced by circuit breakers, which would occur infrequently when breakers are thrown to protect the system during an electrical fault due to line overloads. The resultant noise would be impulsive in character, being loud and short in duration. The maximum impulse noise level from the breakers would be approximately 105 dBA L_{max} at 50 feet (I&R 2021).

The project would also include a battery storage facility located just east of the on-site substation. Based on preliminary plans, the facility would include approximately 250 storage battery units, each enclosed within 40-foot long cargo containers). Each battery storage unit would be self-contained and would include racks, switchboards, and integrated HVAC units. The battery units would be served by inverters, and transformers located on separate pads outside the containers, with each inverter/transformer set serving two battery containers. Thus the battery storage system would consist of 250 battery containers and 125 inverter/transformer sets. The primary noise source would be the HVAC units on each container, which would typically produce noise levels of 68 dBA at a distance of 50 feet during full operation. A typical step transformer has a sound rating of 60 dBA at 5 feet, and a typical power inverter has a noise rating of 77 dBA at 6 feet. Illingworth & Rodkin calculated that the combined noise level from full operation of all of the planned energy storage elements under this configuration would be 92 dBA L_{max}/L_{eq} at 50 feet. The nearest residential receptors to the battery storage facility would be located approximately 1.35 miles southeast and 1.5 miles east of the facility and would be exposed to noise levels of 49 dBA L_{max}/L_{eq} or less.

2035 Kings County General Plan, Noise Policy B1.1.1 requires that appropriate noise mitigation measures be included in a proposed project design when the proposed new use will include non-transportation noise sources that would exceed the County's "Non-Transportation Noise Standards" (Noise Element Table N-8). The daytime noise limits enforced at residential properties are 75 dBA L_{max} and 55 dBA L_{eq} (Kings County 2010f). The inverters/transformers at the project would operate only during daytime hours when the solar facility is generating power. There would be no noise generated by the project at night, when County noise limits are 5 dBA more restrictive (i.e., 70 dBA L_{max} and 50 dBA L_{eq}).

Noise from "point" sources decreases at a rate of 6 dBA with each doubling of the distance between the noise source and receptor (I&R 2021). Based on the worst-case noise level estimate of 72 dBA L_{max}/L_{eq} at a distance of 50 feet from the project solar fields (i.e., inverters/transformers), predicted noise levels at the nearest residential land uses located 0.5 mile from the project site are calculated to be 38 dBA L_{max}/L_{eq}. These noise levels would be inaudible above ambient noise levels. Battery storage facility noise levels would be 49 dBA L_{max}/L_{eq} at the nearest receptor approximately 1.35 miles to the southeast of the battery facility. The infrequent occurrence of impulsive noise from circuit breakers at the on-site substation would decrease to 62 dBA L_{max} at the nearest residences located at least 1.35 miles from the substation. In summary, the estimated noise levels from project operations would be below the County's 75 dBA L_{max} and 55 dBA L_{eq} noise limits for residential uses. Therefore, the operational noise from the Grape Solar Project would not exceed applicable noise standards at the nearest sensitive receptors, and the impact would be *less than significant*.

Operational Traffic Noise

Traffic generated during project operations would be very light, given the small number of workers who would travel to the site on an intermittent basis. It was calculated that the highest traffic noise increase attributable to project operational traffic on the affected roadways would be less than 0.1 dBA L_{dn}/CNEL above existing traffic noise conditions without the project at the most affected roadway – Nevada Avenue. The noise levels would be well below the applicable impact thresholds, discussed above, and would not be noticeable to the potentially affected sensitive receptors. Therefore, the operational traffic generated by the Grape Solar Project would not result in a substantial permanent increase in ambient noise levels in the project vicinity, and the impact would be *less than significant*.

Decommissioning Phase

Noise levels generated during deconstruction activities would be similar to those generated during construction except that some of the noisiest construction equipment, such as pile drivers and vibratory rollers, would not be used during decommissioning. As is the case with construction noise, the on-site noise generated during decommissioning would be well below County noise standards at the nearest sensitive receptors. Traffic volumes generated during decommissioning would be similar to those associated with construction, and the resulting noise levels would be well below applicable County standards as well. Therefore, the decommissioning activity and traffic associated with the project would not result in a substantial temporary increase in ambient noise levels in the project vicinity, and the impact would be *less than significant*.

In summary, the noise generated during the construction, operations, and decommissioning phases of the Grape Solar Project would not exceed applicable noise standards, and the impact would be *less than significant*.

b) Would the project result in generation of excessive groundborne vibration or groundborne noise levels?

Less-than-Significant Impact. The construction of the Grape Solar Project may generate perceptible vibration in the immediate vicinity of the project site when heavy equipment or impact tools are used. Groundborne vibration levels would be highest during site preparation activities and when the solar arrays are installed, given that the cylindrical steel posts (or H-beams) will be driven into the ground using truck-mounted vibratory drivers.

Vibration is measured as peak particle velocity (PPV) in inches per second. The equipment to be used at the project site that would result in the greatest vibration includes sonic pile drivers, vibratory rollers, and bulldozers. The vibration levels typically produced by a sonic pile driver can reach 0.170 in/sec PPV at a distance of 25 feet. Vibratory rollers and large bulldozers typically generate vibration levels ranging from of 0.089 to 0.210 in/sec PPV at a distance of 25 feet. Vibration levels would vary depending on soil conditions, construction methods, and equipment used (Illingworth & Rodkin 2020).

The California Department of Transportation recommends a vibration limit of 0.5 in/sec PPV for buildings that are structurally sound and designed to modern engineering standards, 0.3 in/sec PPV for buildings that are found to be structurally sound but where structural damage is a major concern, and a conservative limit of 0.08 in/sec PPV for ancient buildings or buildings that are documented to be structurally weakened. No ancient buildings or buildings that are documented to be structurally weakened are present near the project site. Therefore, the applicable impact threshold for groundborne vibration would be levels exceeding 0.3 in/sec PPV at the nearest receptors.

Within the project vicinity, the nearest structures to the construction activity would be: 1) ranch dwellings located on the east side of SR-41, located at least 0.5 miles east, 1.0 mile southeast, and 1.5 miles northeast of the nearest project boundary; 2) the nearest dwellings on 22nd Avenue located at least 2.2 miles northeast of the nearest project boundary; 3) ranch dwellings at Shannon Ranch, located at least 2.5 miles northwest of the nearest project boundary; and 4) ranch dwellings at Stone Land Company Ranch, located at least 3.4 miles west of the nearest project boundary. The potential for greatest vibration would be during heavy equipment movement and vibratory pile driving of the support posts for the solar arrays, which would generate vibration levels of 0.210 and 0.170 in/sec PPV, respectively, at 25 feet from the source. At a distance of 0.5 miles, these vibration levels would not be measurable or detectable at the nearest receiver. These vibration levels would be well below the 0.3 in/sec PPV impact threshold for sound structures, and would also be well below the 0.08 in/sec PPV limit applicable to structurally weakened structures. The majority of construction activity at the project site would occur well beyond these distances from the nearest structures. Therefore, groundborne vibration from project construction would have *no impact* on existing structures in the project vicinity.

People can also be adversely affected by excessive vibration levels. The level at which humans begin to perceive vibration is 0.015 inches per second. Vibrations at 0.2 inches per second are considered bothersome to most people, while continuous exposure to long-term PPV is considered unacceptable at 0.12 inches per second (I&R 2021). As noted above, the nearest residential receptors are 0.5 miles east of the project site. At these distances, the greatest vibration from the nearest project construction activity would not be perceptible to the nearest residents in the project vicinity. Therefore, project construction activities would not generate excessive vibration levels.

In summary, the heaviest construction equipment that would be used for construction of the Grape Solar Project would produce vibration levels that would be far below the vibration levels necessary to cause damage to the nearest off-site buildings, or to be perceptible to the nearest off-site persons. Therefore, the project would not generate excessive groundborne vibration levels. As such, the potential groundborne vibration and noise impacts due to construction activities associated with the Grape Solar Project would be *less than significant*.

c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

<u>Less-than-Significant Impact</u>. The Grape Solar Project is not located near a public airport or public use airport, and is not located within an airport land use plan area. The nearest public or public use airports include the Hanford and Coalinga municipal airports, and the Harris Ranch airfield, all of which are located 18 miles or more from the project site.

The project site is located 9.0 miles south of the airfield at Naval Air Station Lemoore (NASL), and is included in the study area for the NAS Lemoore Joint Land Use Study (JLUS). The project site is located within the NASL flight pattern and is mapped as land subject to noise levels lower than 70 dBA CNEL as mapped in the NAS Lemoore Joint Land Use Study. The eastern third of the project site is exposed to noise levels between 60 and 70 dBA CNEL, while the western two-thirds of the site is exposed to noise levels of less than 60 dBA CNEL (JLUSPC 2011, p. 2-11). The Kings County General Plan noise standard for the noise-sensitive outdoor areas of commercial or industrial developments is 65 dBA CNEL if the noise is from transportation sources such as aircraft overflights (Kings County General Plan Noise Element Table N-7). There is an area of about 125 acres (~8% of the site area) along the eastern site boundary that is exposed to aircraft noise levels of 65 dBA CNEL or higher. However, the proposed solar facilities are not considered noise-sensitive land uses and will have no permanent employees stationed on-site that would utilize outdoor use areas. Although Kings County has not established a noise limit for outdoor use areas that are not noise sensitive, noise levels exceeding 76 dBA CNEL are considered hazardous to health as determined by the US Environmental Protection Agency (US EPA 1974). Aircraft overflights would expose construction workers, who would be on the site temporarily, and the operational workers, who would visit the site periodically, to worst-case noise levels of less than 70 dBA CNEL, which is well below the 76 dBA CNEL threshold. Therefore, the project would not expose workers on the project site to excessive noise levels from flight operations as NAS Lemoore. As such, the impact of the Grape Solar Project's exposure to noise from airport operations would be *less than significant*.

The Grape Solar Project site is not located within the immediate vicinity of a private airstrip. There are six airstrips within a 5-mile radius of the site, the nearest of which is at ranch complex located 1.2 miles to the south. Aircraft overflights associated with private airstrips are infrequent in nature, and as such, the project would not expose people working at the project site to excessive noise levels associated with the operation of a private airstrip. Therefore, the Grape Solar Project would be associated with *no impact* due to noise generated by private airstrips in the vicinity.

In summary, the impact resulting from the Grape Solar Project's exposure to noise from airport operations associated with a private airstrip or public airport or public use airport or would be *less than significant*.

REFERENCES – NOISE

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CPUC 2009	California Public Utilities Commission (CPUC). 2009. *Draft Environmental Impact Report – Southern California Edison's San Joaquin Cross Valley Loop 220 KV Transmission Line Project*. CPUC A.08-05-039. June 2009. http://www.cpuc.ca.gov/Environment/info/esa/sjxvl/deir_toc.html
I&R 2021	Illingworth & Rodkin (I&R). 2021. *Grape Solar Project – Noise and Vibration Assessment*. February. [Contained in Appendix C of this document.]

JLUSPC 2011	Naval Air Station Lemoore Joint Land Use Study Policy Committee, 2011. NAS Lemoore Joint Land Use Study – Final Release. August 30. https://www.kingscog.org/jlus_docs#B93D5C3D-9848-4BBF-8A50-E7769AD28E68
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US EPA 1974	U.S. Environmental Protection Agency (US EPA). 1974. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. March. Available at https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=2000L3LN.TXT

4.14. POPULATION and HOUSING

Would the project:		Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant	No Impact
a)	***Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?***	☐	☐	☐	■
b)	***Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?***	☐	☐	☐	■

Environmental Evaluation

a) Would the project induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

No Impact. The Grape Solar Project would not include a residential component so it would not directly induce population growth in the area. The project would involve a maximum construction workforce of about 570 workers during the peak period of construction. These construction workers are expected to be drawn from the existing labor pool in the region. For construction management staff and specialized workers who may reside outside the area, there is an ample supply of temporary lodging in the nearby communities of Lemoore and Hanford. Thus project construction would not directly result in population growth in the area.

Upon completion, no permanent operational staff would be stationed at the solar facility, but up to 10 workers would visit the site on any given day to perform inspection, maintenance, repair, and panel cleaning duties. Since the solar facility operations would be managed by a contractor, the project would likely be one of several solar facilities serviced by these workers. Thus the project would result in the need for additional personnel only if it resulted in the contractor exceeding its capacity to continue to service its client solar facilities at existing staffing levels with the addition of the Grape Solar Project. In the event that new workers are needed to service the project, such workers may need to relocate to the area for such new employment opportunities. According to the most recent census estimates (2019), there are approximately 30,192 vacant housing units within a 50-mile radius of the project site in Kings, Fresno, and Tulare Counties, representing an overall vacancy rate of 5.6 percent (U.S. Census 2019). Thus it is anticipated that any operational staff seeking to relocate to the area would find ample housing choice from the existing inventory of homes in the region, and no new housing would be required. Therefore, the Grape Solar Project would result in *no impact* with regard to potential inducement of substantial unplanned population growth in the area. .

The project would not result in the extension or roads or urban utilities (e.g., water and sewer) to lands not currently served by urban infrastructure, and thus would not induce unplanned urban development into the rural area of the County. Therefore, the project would not induce indirect growth through extension of urban infrastructure.

In summary, the Grape Solar Project would result in *no impact* with respect to growth inducement, either by way of population growth or by extension of urban infrastructure.

b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

No Impact. There are no residential buildings on the Grape Solar Project site or within a 0.5-mile radius of the site. The nearest residences to the project site include the following: 1) Three ranch complexes (with a total of eight dwellings) located 0.5 mile east, 1.0 mile southeast, and 1.5 miles northeast of the project site along the east side of SR-41; 2) Five dispersed agricultural residences located 2.2 to 3.9 miles northeast of the project site along 22nd Avenue; 3) The Shannon Ranch complex (including 20 dwellings) located 2.5 miles northwest; and 4) The Stone Land Company Ranch (with 2 dwellings) located 3.4 miles west along Nevada Avenue. None of these residential properties would be removed or encroached upon as a result of the project. Therefore, the Grape Solar Project would result in *no impact* with regard to displacement of existing people or housing.

REFERENCES – POPULATION AND HOUSING

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https://data.census.gov/cedsci/table?q=Tulare%20County%20California%20Housing&tid=ACSDP1Y2019.DP04&hidePreview=false

4.15. PUBLIC SERVICES

Would the project:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant	No Impact
a) 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:				
i) Fire protection?	☐	☐	☐	■
ii) Police protection?	☐	☐	☐	■
iii) Schools?	☐	☐	☐	■
iv) Parks?	☐	☐	☐	■
v) Other public facilities?	☐	☐	☐	■

Setting

Fire Protection Services

Fire protection for the project area is provided by the Kings County Fire Department (KCFD), which operates 10 fire stations and one headquarters office in Hanford with 88 full-time employees. The Fire Department responds to over 5,100 calls annually, averaging 14 calls daily (KCFD 2020).

The nearest KCFD fire stations to the project site are KCFD Station #10, located in Stratford approximately 4 miles northeast of the Grape Solar Project site, and Station #9, located in Kettleman City approximately 9 miles south of the site. Response times from the two nearest stations would range from 4 minutes to 15 minutes depending on the location of the call within the project site. Backup response would be provided by Station #7 (south Lemoore) and Station #5 (Armona), which would respond to a call from the site within the KCFD's 20-minute rural response time goal. The KCFD maintains mutual aid agreements with the fire departments of Lemoore and Hanford, and also with the NAS Lemoore Fire Department and Santa Rosa Rancheria Fire (Kings County 2010e).

The KCFD's other responsibilities include: review of building plans for compliance with fire safety requirements; emergency medical response; and implementation of the County's emergency management plan. Each station conducts assessments of proposed industrial and business facilities to assure compliance with safety and design capacity requirements. Fire stations also handle weed abatement on a complaint basis (KCFD 2020).

The KCFD provides first responder emergency medical service to all County residents. This service does not include advanced life support (paramedic) or emergency transport, which is provided by an exclusive private contractor (currently American Ambulance). Kings County contracts directly with the ambulance company, while the Central California Emergency Medical Services Agency (CCEMSA) is responsible for ensuring adequate levels and quality of ambulance service the region. The ambulance services nearest to the project site are located in Lemoore and Hanford.

The Potential Fire Hazards map of the Kings County General Plan Health and Safety Element (General Plan Figure HS-9) shows most of the project site as being subject to “Little or No Threat” or “Moderate Threat.” The nearest areas mapped as being subject to “High Threat” are around the Shannon Ranch (2.5 miles northwest) and near the intersection Nevada Avenue and Avenal Cutoff Road (5 miles west)(Kings County 2010e). The Grape Solar Project site is not included in a Fire Hazard Severity Zone (FHSZ) as mapped by the California Department of Forestry and Fire Protection (CAL FIRE 2007a, CAL FIRE 2007b).

Law Enforcement Services

Law enforcement services in the project area are provided by the Kings County Sheriff’s Office (KCSO) from its headquarters at 1444 West Lacey Boulevard approximately 17 miles northeast of the project site. The Department currently has 148 sworn officers and 101 non-sworn personnel. The County is divided into six beat districts with five Sheriff’s substations located throughout Kings County. The nearest Sheriff's substation to the project site is located in Stratford. Each beat district has at least one deputy sheriff on duty at all times to serve the unincorporated communities and surrounding County areas. The KCSO has mutual-aid agreements statewide. The Department’s response time goal for priority emergency calls is 20 minutes (Kings County 2010e). The response time to the project site would be a maximum of 15 to 20 minutes, and would be quicker when the area deputy is on patrol nearby. The principal crimes committed in Kings County in 2019 were larceny, aggravated assault, burglary, and motor vehicle theft (CDOJ 2020).

The California Highway Patrol (CHP) provides traffic enforcement along State highways and County roadways within Kings County. The nearest CHP area offices are located in Hanford and Coalinga.

Other Public Services and Facilities

Other public services provided in the project area include schools, parks and recreation, libraries, and social services, among other things. The Grape Solar Project would generate little or no demand for these public services and their related facilities.

Environmental Evaluation

a) 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:

i) Fire protection?

No Impact. Construction and operation of the Grape Solar Project is not expected to result in an increase in demand of fire protection services leading to the construction of new or physically altered facilities.

Fire Hazards During Construction

During construction, there is a small risk of construction equipment and materials posing potential fire hazards. Construction of the solar facilities, substations, and power collection lines would involve the use of heavy construction equipment, vehicles, generators, and hazardous materials (e.g., fuels, lubricating oils, and welding materials), which pose potential fire hazards. The risk of fire would be primarily related to refueling and operating vehicles and equipment off internal driveways where dry vegetation could be ignited. Welding activities also have the potential to result in the combustion of vegetation, as would smoking by construction workers.

As discussed in Section *2.2. Project Description*, construction workers would receive training in fire safety and suppression in order to prevent fire and respond effectively if fire does break out. During solar facility construction, water trucks used for dust suppression would be available for suppression of small fires.

Fire Hazards During Solar Facility Operation

During solar facility operation, equipment such as transformers, inverters, and substation equipment would involve the use of oils (e.g., dialectic or mineral oils and lubricants) and fuels, which would pose potential fire hazards. The battery storage facilities would also pose a potential fire hazard. Maintenance vehicles and panel washing trucks would travel among the solar arrays where low vegetation would be dry in summer and potentially combustible. Overhead power collection lines would pose a fire hazard in the event a conducting object comes in proximity to a line or in the unlikely event that a live-phase conductor (electrical wire) falls to the ground. Smoking by operational personnel would also pose a fire hazard.

The project would include a number of design and operational measures for fire prevention and suppression. The project would be constructed in accordance with the California Fire Code. Electrical equipment such as transformers and inverters would be placed on concrete foundation pads and housed in steel and concrete equipment enclosures, minimizing the risk of electrical sparks that could ignite vegetation in the event of equipment failure. All electrical equipment (including inverters) not located within a larger structure would be designed specifically for outdoor installation, and all electrical equipment would be subject to product safety standards. Portable carbon dioxide (CO_2) fire extinguishers would be mounted at the inverter/transformer pads throughout the project. Maintenance crews would regularly inspect facilities for reliability and safety.

The project would also include energy storage facilities consisting of a number of prefabricated electrical enclosures containing battery banks and associated switchboards, inverters and transformers. All battery containers would be installed on concrete foundations designed to provide secondary containment. The enclosures would have appropriate fire suppression systems built to code. Each energy storage unit used on site would be designed in compliance with Section 608 of the International Fire Code, which has been adopted by the State of California to minimize risk of fire from stationary storage battery systems and contain fire in the event of such an incident. Under California law, the battery enclosures also must comply with Article 480 of the Electrical Code, which presents requirements for stationary storage batteries. Article 480 provides the appropriate insulation and venting requirements for these types of systems, further preventing associated risk of fire from the battery enclosures on the project site. Depending on the technology and design of the battery units, the Kings County Fire Department may require purchase of specialized hazmat vehicles and equipment along with mandated training for Fire Department personnel.

The Grape Solar Project would be required to comply with fire safety standards under Section 10-7 of the Kings County Code, under which the regulations of the National Fire Protection Association and the American Insurance Association are applied. The Fire Marshal and Public Works Department would review the project plans to ensure compliance with all code requirements and standards. The Building Division of the Kings County Community Development Agency would ensure Fire Code requirements are met through the plan check process, building permit issuance, construction inspection, and issuance of certificate of occupancy once all of the work has been completed and the final inspection has been approved.

The approval of the project would be subject to conditions including compliance with the provisions of the Kings County Improvement Standards with respect to emergency vehicle access. As required by the Fire Department, all structures (including solar arrays) must be accessible by fire-fighting equipment and personnel via internal fire access driveways. These internal gravel driveways would consist of a durable dust-free (oiled) surface, in accordance with the Kings County Improvement Standards, which would inhibit the growth of vegetation. The Fire Department also requires minimum of 4 feet of separation between rows of solar modules to allow access by fire suppression personnel. The construction of the 20-foot-wide driveway following the perimeter of the site would act as a fire break between the site and off-site areas, thereby limiting the potential for a fire at the site to spread off-site. The project proponent would also provide funds toward the purchase of an all-terrain firefighting vehicle capable of accessing the interior portions of the solar facility. (For further detail on fire protection features proposed for the project, see Section *2.2. Project Description*.)

The project approval would also include a condition that all detailed project plans are subject to review and approval by the County Fire Marshal to ensure that potential fire hazards are adequately addressed. This includes a requirement that the applicant shall provide training to fire personnel to enable them to interrupt electrical supply safely during emergency incidents requiring fire suppression or rescue activities. The Fire Department may also require a supply of firefighting water available in storage tank(s) on the project site. The need for such storage tank(s) would be determined by the Fire Department during plan check at the building permit stage.

As required in Mitigation Measures AG-1: Agricultural Management Plan, and AG-2: Soil Reclamation Plan, and HYD-1: Stormwater Quality Protection, the remaining exposed soils on the project site after construction would be revegetated with native seed mix to prevent erosion and dust generation, and to sustain continued agricultural production on the site through sheep grazing, and also to protect on-site soils for future reclamation upon decommissioning. The vegetative cover would be kept low through sheep grazing activity and mechanical means which would reduce fuel load buildup and reduce the potential hazard from grass fires. As is the case with all mitigation measures identified in this document, Mitigation Measures AG-1, AG-2, and HYD-1 would be imposed as conditions of project approval.

In summary, although the project would result in an incremental increase in demand for Fire Department services, this increase is expected to be minor and thus would not result in degradation of service levels or in the need for new or expanded facilities. Therefore, the Grape Solar Project would result in *no impact* related to an increase in fire protection services that would necessitate the alteration or construction of fire stations or other infrastructure to combat fire.

ii) Police Protection?

No Impact. Construction and operation of the Grape Solar Project is not expected to result in increased in demand of police protection services leading to the construction of new or physically altered facilities.

Law enforcement services to the Grape Solar facility would be provided by the Kings County Sheriff's Office. During construction of the solar facility, slow moving trucks could result in temporary congestion on public roadways near the project entrances, and could pose a safety hazard due to abrupt changes in the speed of traffic flow, or due to slow turning movements across on-coming lanes of traffic. Any temporary traffic disruptions would involve coordination with the Sheriff's Office. The temporary traffic hazards associated with construction of the project are discussed in Section *4.17. Transportation*. Any potential traffic hazard impacts would be minimized through implementation of traffic control measures specified in Mitigation Measure TR-1. The traffic control measures required during construction may result in a minor temporary use of the Kings County Sheriff's Office's resources, but would have *no impact* in terms of necessitating new or expanded Sheriff's Office facilities to maintain adequate service levels.

Once the project is completed and operational, calls for service from the solar facility are expected to be infrequent, primarily due to the comprehensive security measures included in the design and operation of the solar project. The design features for project security are described as follows. The perimeter of each project phase will be securely fenced and gated to prevent unauthorized access. Electronic surveillance equipment such as infrared security cameras and motion detectors would be installed around the solar facility. These security features are intended to act as a deterrent to crimes such as theft and vandalism, and would be operationally integrated with the services of a private security company. The video feeds from the installed surveillance equipment would be transmitted in real time to the off-site security contractor for monitoring. In the event that the surveillance system detects a breach, a security representative would be dispatched to the site, as needed, and the County Sheriff's Office would be notified as appropriate.

In summary, it is expected that project operations would result in minimal demand on the Sheriff's Office's operations and would not degrade service levels or result in the need for new or altered Sheriff's Office facilities. Therefore, the Grape Solar Project would result in a minor increase in demand for law enforcement services, but would have *no impact* in terms of necessitating new or expanded Sheriff's Office facilities to maintain adequate service levels.

iii) Schools?

No Impact. The Grape Solar Project will not include a residential component and thus would not generate school-aged children that could result in the need for new or expanded school facilities. Therefore, the project would have *no impact* on schools. However, the Grape Solar Project will pay a school mitigation fee, as mandated by State law for all commercial development.

iv) Parks?

No Impact. Demand for parks and recreation is mainly generated by residential development. No permanent staff would be stationed at the solar facility, and the few staff who would visit the facility to perform routine maintenance activities would be unlikely to seek out recreational activities while in the project area. As such, the Grape Solar Project would not increase demand for parks and recreational facilities, and would have *no impact* in terms of necessitating new or expanded parks or recreation facilities to maintain adequate service levels.

v) Other Public facilities?

No Impact. **T**he Grape Solar Project would not generate demand for social services, courts, libraries, or other public services. As such, the Grape Solar Project would have *no impact* in terms of necessitating new or expanded facilities to maintain adequate service levels for other public services.

REFERENCES – PUBLIC SERVICES

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4.16. RECREATION

Would the project:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant	No Impact
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	■
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?	☐	☐	☐	■

Environmental Evaluation

a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

No Impact. The Grape Solar Project would not include a residential component and thus would not result in an increase in local population which might in turn result in a substantially increased use of or demand for neighborhood or regional parks, or other recreational facilities. Construction workers commuting to the project would comprise existing residents from surrounding communities who would utilize recreational facilities in those communities. No permanent staff would be stationed at the solar facility, and a small number of personnel would visit the facility to perform routine maintenance activities. Neither the project construction workers nor operations personnel would be unlikely to seek out recreational activities while working in the project area. Therefore, the Grape Solar Project would have *no impact* in terms of causing or accelerating physical deterioration of recreational facilities.

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?

No Impact. The Grape Solar Project would not include recreational facilities, and thus would not result in impacts associated with such facilities. The project would not include a residential component or on-site operational staff, and thus would not result in increased demand for recreational facilities. As such, the Grape Solar Project would have *no impact* related to construction or expansion of recreational facilities.

4.17. TRANSPORTATION

Would the project:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant	No Impact
a) ***Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?***	☐	☐	■	☐
b) ***Conflict with or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b)?***	☐	☐	■	☐
c) ***Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?***	☐	■	☐	☐
d) ***Result in inadequate emergency access?***	☐	■	☐	☐

Transportation Setting

State highways in the vicinity that serve the project area include State Route 198 (SR-198) located to the north, SR-41 located to the east, SR-269 located to the west, and Interstate 5 located to the southwest. The Kings County roads serving the project area include: Nevada Avenue, which runs along the southern site boundary from east to west, and Avenal Cutoff Road, which runs to the west of the project site in a southwest-northeast direction.

The nearest public use airports in the project area include those at Hanford, Coalinga, and Harris Ranch, which are located at least 18 miles from the project site. The airfield at Naval Air Station Lemoore (NASL) is located 9.5 miles north of the Grape Solar Project site. There are six private airstrips in the project area within a 5-mile radius of the project site, the nearest of which is located at the ranch complex located 1.2 miles to the south.

The nearest public transit routes of the Kings Area Rural Transit (KART) are along SR-198 to the north and SR-41 to the east. The nearest existing bikeway runs along the Avenal Cutoff Road to the northwest of the Grape Solar Project site, extending from SR-198 south to the Fresno County line (Kings County 2010d).

Regulatory Setting – Update

As mentioned previously in this document, the subject IS/MND is tiered from the Programmatic EIR on the Westlands Solar Park Master Plan and Gen-Tie Corridors Plan which was certified in January 2018. As such, the comprehensive Environmental Setting and Regulatory Setting discussions from the PEIR are incorporated by reference and are not presented in full in this IS/MND. However, significant revisions to the CEQA Guidelines related to the evaluation of transportation impacts have taken effect since the PEIR was certified. These Guidelines revisions are intended to implement Senate Bill 743, as discussed below.

Senate Bill 743

California Senate Bill 743 (SB 743), which went into effect in January 2014, states that "[n]ew methodologies under the California Environmental Quality Act are needed for evaluating transportation impacts that are better able to promote the state's goals of reducing greenhouse gas emissions and traffic-related air pollution, promoting the development of a multimodal transportation system, and providing clean, efficient access to destinations." Under SB 743, the focus of transportation analysis shifts from driver delay, which is typically measured by traffic level of service (LOS), to a new measurement, vehicle miles traveled (VMT). This change in metrics is intended to further the State's long-term greenhouse gas reduction goals by reducing fuel consumption in the transportation sector, specifically through reductions in per capita VMT associated with new land use projects, and thereby promoting compact, mixed-use development patterns.

In order to implement SB 743, the Natural Resources Agency adopted revisions to the CEQA Guidelines which became effective on December 28, 2018. The revised CEQA Guidelines eliminate the application of LOS-related metrics for determining the significance of transportation impacts associated with development projects, land use plans, and transportation infrastructure projects. Under the new guidelines, VMT-related metric(s) are required to evaluate the significance of transportation-related impacts under CEQA. (The specific requirements of the Guidelines revisions under SB 743 are discussed in item 'b)' below.) SB 743 does not preclude the use of LOS-related metrics in local general plan policies, zoning codes, conditions of approval, or any other planning requirements that require evaluation of LOS, but these metrics may no longer constitute the basis for determining the significance of transportation impacts under CEQA.

Under SB 743, local land use agencies were required to establish VMT significance thresholds to be applied in CEQA analyses of proposed land use projects by July 1, 2020. However, on June 9, 2020 the Kings County Board of Supervisors adopted Resolution No. 20-041 delaying the implementation of Vehicle Miles Traveled requirements in Kings County for at least 2 years. Accordingly, the following environmental evaluation includes transportation impact analyses based on both the LOS metric (addressed in item 'a)' below) and the VMT metric (addressed in item 'b)' below).

Environmental Evaluation

a) *Would the project conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?*

Roadway Facilities

Transportation policies and programs in Kings County are set forth in the Kings County *2035 General Plan Circulation Element* which establishes Level of Service D as the minimum service level to be maintained on County streets and roadways (Kings County 2010d).

Since the Grape Solar Project will also generate traffic on Fresno County roadways as well as State highways, the LOS policies Fresno County and the California Department of Transportation (Caltrans) are also considered in this analysis. Fresno County has policies which establish Level of Service (LOS) D as the minimum acceptable level of service on urban roads, and LOS C on rural roads (Fresno COG

2014). For all State highways within Kings County, Caltrans applies the service standard of LOS D for Regionally Significant Routes pursuant to the Kings County Regional Transportation Plan (Caltrans 2013). Therefore, the traffic generated by the project would conflict with the applicable LOS policies if it results in a degradation of Level of Service to lower than LOS D on a Kings County road or State highway, or LOS C on a rural County Road in Fresno County.

Less-than-Significant Impact. As is typical of all PV solar projects, the Grape Solar Project would generate the greatest volume of traffic during the construction phases when substantial numbers of workers are onsite during site preparation, grading, panel installation, and electrical equipment installation for the project. The construction period is also when the greatest number of truck deliveries are made, including deliveries of grading and construction equipment, solar panels, racking systems, electrical equipment, gravel, asphalt, and concrete, among other materials.

Construction Traffic

Since the project would generate the highest traffic volumes during the construction phases, a screening level of analysis was conducted to determine if adverse impacts to roadway system performance would occur, even under temporary conditions during project construction. In order to evaluate worst-case conditions, the traffic generated during the peak construction period was evaluated to represent project conditions. The peak period of construction activity would occur during a 6-week period when Phases 1 and 2 of construction would overlap (this peak period represents 10 percent of the total 61-week duration of construction). During this peak period, there would 570 workers commuting to the project site daily, resulting in a total of 1140 daily trips (see Table 2 in Section *2.2. Project Description* for a summary of construction vehicle usage by construction phase). For purposes of analysis, it was assumed that no workers would carpool or use transit or shuttle buses.

Construction workers would arrive at the site prior to the 7 AM start time and depart the site between 3 and 4 PM. As such, few if any workers are expected to be on the roadway network between the peak commute periods of 7 to 9 AM or 4 to 6 PM. (Note: Mitigation TR-1 requires that the generation of construction-related traffic be minimized during these peak commute periods.) Since project traffic generation during the AM and PM peak periods is therefore expected to be negligible, no evaluation of peak hour traffic impacts was warranted.

Project worker commute traffic was distributed to the roadway system in accordance with a gravity model that considered time and distance factors relative to regional population centers to determine directional trip assignments. The average daily truck traffic that was estimated for the peak construction period was similarly distributed according to place of origination for each type of delivery. In order to reflect the effect of larger trucks on highway capacity, all truck trips were multiplied by 1.5 to derive Passenger Car Equivalent (PCE) trips generated by trucks. Deliveries were also multiplied by two to reflect inbound and outbound trips. Table 11, on the next page, shows the effect of project construction traffic on the surrounding roadway network. In order to establish Baseline traffic conditions on the study roadways for 2022, the existing count data for each roadway segment was increased by 1 percent per year from its latest count date. This growth rate is somewhat higher than the statewide increase in traffic volumes on State highways over the 10 year period from 2006 and 2016 (the latest period for which statewide data is available).

TABLE 11
GRAPE SOLAR PROJECT – CONSTRUCTION TRAFFIC
(BASED ON PEAK CONSTRUCTION PERIOD WHEN CONSTRUCTION PHASES 1 + 2 OVERLAP)

Roadway Segment	Baseline Traffic Conditions				Level of Service (LOS)		Project Traffic Conditions[1] (During Peak Construction Period)				
	AADT[2]		Roadway Lanes (Agency)[5]	Base-line LOS[6]	Applicable Minimum LOS Standard[7]	Maximum AADT at Min. LOS Standard[8]	Avg. Daily Project Trips[9]	Roadway AADT with Project	Project % Increase over Baseline	LOS with Project	Exceeds Applicable Min. LOS Standard?
	Existing[3]	Baseline[4] 2022									
SR-198 - b/n SR-41 & 19th Ave.	23,200[10]	24,142	4 (fwy)(CT)	B	D	67,100	476	24,618	2.0%	B	No
SR-41 - b/n SR-198 & Bush St.	18,200[10]	18,939	4 (fwy)(CT)	B	D	67,100	418	19,357	2.2	B	No
- b/n SR-198 & Jackson Ave.	13,100[10]	13,632	2 (CT)	D	D	16,400	894	14,526	6.6	D	No
- b/n Jackson & Nevada Aves.	10,000[10]	10,509	2 (CT)	C	D	16,400	1,056	11,565	10.0	C	No
- b/n Nevada & Quail Aves.	7,800[10]	8,117	2 (CT)	C	D	16,400	36	8,153	0.4	C	No
SR-269 - b/n SR-198 & Jayne Ave.	6,650[10]	6,893	2 (CT)	C	D	16,400	70	6,963	1.0	C	No
Avenal Cutoff Road - b/n I-5 and Nevada Ave.	3,388[11]	3,456	2 (KC)	C	D	16,400	70	3,526	2.0	C	No
Nevada Avenue - b/n SR-41 & Project Entrance	707[11]	721	2 (KC)	B	D	16,400	1,092	1,813	151.5	B	No
- b/n Project Entrance & Avenal Cutoff Rd.	707[11]	721	2 (KC)	B	D	16,400	400	1,121	55.4	B	No
Jane Avenue - b/n Avenal Cutoff & SR-269	4,167[11]	4,250	2 (FC)	B	C	13,800	336	4,586	7.9	C	No
- b/n SR-269 & I-5	5,102[11]	5,204	2 (FC	B	C	13,800	260	5,464	5.0	C	No
- b/n I-5 & SR-33	6,460[11]	6,590	2 (FC)	C	C	13,800	236	6,836	3.6	C	No

[1] Table includes only roadway segments subject to 40 or more daily trips during the 6-week peak construction period.
[2] AADT = Annual Average Daily Trips
[3] "Existing" = traffic volumes on roadways and highways at time of the most recent counts.
[4] Existing AADT was increased by 1% per year from count year to Baseline Year (2022).
[5] Agency abbreviations: KC = Kings County; CT = Caltrans; FC = Fresno County.
[6] Source: Kings County 2010d, p. C-14 (LOS thresholds based on Highway Capacity Manual).
[7] Minimum LOS Standards by Agency: Kings County = LOS D; Caltrans = For State highways through Kings County, Caltrans applies KCAG standard of LOS D for RTP Regionally Significant System; Fresno County = LOS D (urban), LOS C (rural).
[8] Source: Kings County 2010d.
[9] Project Daily Trips: Average Day = Average daily trips generated during the peak construction period.
[10] Source: Caltrans 2020 (reflects 2018 volumes).
[11] Source: National Data & Surveying Services (NDSS) 2020 (machine counts taken in September 2020).

In general, the project-generated traffic would be low relative to existing daily traffic volumes on the affected roadways. Table 11 includes only those roadway segments that would be subject to 40 daily project-generated trips (or 20 round trips per day). All other roadway segments would have fewer than 40 daily trips added due to project construction traffic.

As shown in Table 11, none of the affected roadway segments would be subject to a change in Level of Service due to project-generated construction traffic. During the 6-week period of peak project construction activity, the most heavily affected roadway segment – Nevada Avenue near the project entrance – would be temporarily subject to a 1.5-fold increase in daily traffic east of the project entrance, and a 55 percent increase in daily traffic volumes west of the project entrance. However, due to the very low existing traffic volumes on Nevada Avenue, the service level would remain at acceptable LOS B on this roadway during the peak construction period. Other roadways in the vicinity would be subject to temporary increases of 0.4 to 10.0 percent in overall traffic volumes. The project-generated traffic volumes would be lower during all other periods of construction (representing 90 percent of the 14-month construction period) on all affected roadways.

In summary, project construction traffic would not result in a reduction of service levels on any of the affected roadways, which would remain at LOS B or LOS C on all affected roadway segments. Thus all roadways affected by project construction traffic would continue to operate at LOS C or better, thus maintaining the County's LOS standard of D as established in the *General Plan Circulation Element,* and also maintaining the LOS C standard applicable on State highways and Fresno County's rural roads. Thus, the increment of traffic volume generated by the Grape Solar Project during construction would represent a *less-than-significant* impact in terms of conflicts with Level of Service policies applicable to the affected roadways.

Operational Traffic

Once the Grape Solar facility is operational, the project-generated traffic would become very light. No permanent staff would be stationed at the solar facility, although operations and maintenance contractors would visit the project on a regular basis to perform inspections, maintenance and repairs. Panel washing crews would work on the site up to four times per year for several weeks at a time, and sheep contractors would be present on the site during the early months of each year. There would also be occasional truck deliveries for replacement parts and other materials. On average, it is estimated that up to 10 daily round trips would be generated by the operational workers on any given day. Truck deliveries would be expected to occur intermittently during the year. The very low volume of worker and delivery truck traffic generated during project operations would have a negligible effect on the performance of the roadway system serving the project, and the impact of operational traffic from the Grape Solar Project would be *less than significant* in terms of conflicts with Level of Service policies applicable to the affected roadways.

Decommissioning Traffic

As discussed in Section *2.2. Project Description*, the level of activity during decommissioning (or deconstruction) of the Grape Solar Project is expected to be similar to the activity level during project construction. Thus the number transport vehicle trips required for off-haul of decommissioned materials is expected to be similar to the number of trips required to haul the materials to the site during construction. The number of workers required on-site is also expected to be about the same, while the use of construction equipment would be similar or a little less. For purposes of analysis, it is assumed that traffic generated during decommissioning would be the same as the traffic generated during construction, as shown in Table 11 above. As shown in the table, project-generated traffic volumes would generally be very low relative to current traffic volumes on the affected roadways, and levels of performance would not be adversely affected by the project decommissioning traffic. At the time of project decommissioning in about 25 years, the long-term traffic forecasts for the affected roadways indicates that all roadways will be operating at acceptable service levels at that time (KCAG 2018, Fresno COG 2013). The temporary addition of relatively small volumes of traffic from project decommissioning would have a *less than significant* impact in terms of conflicts with Level of Service policies applicable to the affected roadways at the time of decommissioning.

In summary, the Grape Solar Project would not conflict with any Level of Service policies established by any transportation agency with jurisdiction over roadways affected by project-generated traffic. Therefore, the Grape Solar Project would have a *less-than-significant impact* in this regard.

Transit, Roadway, Bicycle and Pedestrian Facilities

Less-than-Significant Impact. The Regional Bike Routes plan in the *2035 Kings County General Plan Circulation Element* shows an existing bikeway on Avenal Cutoff Road that passes to the northwest of the Grape Solar Project site, and also a planned bikeway along Nevada Avenue between Avenal Cutoff Road and SR-41. The project would introduce additional traffic which would increase potential interaction between bicyclists on the roadway and vehicles making turning movements from Nevada Avenue to access the project site. However, project egress would be controlled by stop signs, and sight-lines in all directions would be very good given the flat terrain and lack of visual obstructions. During project construction, the small increases in traffic congestion and hazard introduced by slow moving vehicles would be addressed through implementation of the traffic safety measures identified in Mitigation Measure TR-1, which would also be expected to reduce potential traffic hazards to bicyclists. As such, the project would not pose a safety hazard to bicyclists or otherwise decrease the performance of the existing or planned bikeways in the project vicinity.

The nearest other planned bikeway in the project area is along Jackson Avenue between Avenal Cutoff Road and 18th Avenue. This planned bikeway segment is several miles from the project site and would not be directly affected by the project, and also would not be indirectly affected since little if any project-generated traffic would use that roadway segment. The project would not conflict with any adopted policies, plans, or programs regarding bicycle facilities, or otherwise decrease the performance or safety of bicycle facilities (Kings County 2010d).

There are no existing or planned public transit routes or pedestrian facilities in the project vicinity, so the project would not decrease the performance or safety of such facilities. The project would not conflict with any adopted policies, plans, or programs regarding transit or pedestrian facilities, or otherwise decrease the performance or safety of transit or pedestrian facilities (Kings County 2010d).

In summary, the Grape Solar Project would result in no potential conflicts with transit, bicycle, or pedestrian plans, policies, or programs, or otherwise decrease the performance or safety of such facilities. Therefore, the Grape Solar Project would have a *less-than-significant impact* in this regard.

b) Would the project conflict with or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b)?

As discussed under Regulatory Setting above, this new section of the CEQA Guidelines was included in the comprehensive amendments to the State CEQA Guidelines which took effect on December 28, 2018. The referenced Guidelines Section 15064.3(b) sets forth revised criteria for analyzing transportation impacts of proposed projects, as required under AB 734. For land use projects, this section states that "vehicle miles traveled exceeding an applicable threshold of significance may indicate a significant impact." The purpose in applying vehicle miles traveled (VMT) as the analytical metric is to further the State's long-term greenhouse gas reduction goals by reducing fuel consumption in the transportation sector, specifically through reductions in per capita VMT associated with new land use projects. The establishment of specific significance thresholds is left up to each lead agency to develop in the course of implementing corresponding amendments to its local CEQA guidelines. As noted, on June 9, 2020 the Kings County Board of Supervisors adopted Resolution No. 20-041 delaying the implementation of Vehicle Miles Traveled requirements as authorized in Senate Bill 743 for at least 2 years. Therefore, the following analysis is provided for informational purposes only.

In the Technical Advisory issued by the Governor's Office of Planning and Research (OPR) for guidance in implementing SB 734, the recommended significance threshold for residential projects is defined as VMT exceeding a level of 15 percent below regional VMT per capita, and for office and retail projects a significant transportation impact would occur if project-generated VMT exceeds a level of 15 percent below regional VMT per employee (OPR 2018, pp. 15-16). OPR's Technical Advisory does not address other land uses, and suggests that thresholds for other land uses be developed at the local level.

To address transportation impacts from small projects, the OPR Technical Advisory recommends the application of "screening thresholds" to identify when a project would be expected result in a less-than-significant transportation impact without conducting a detailed study. The Technical Advisory states that, in general, projects that generate fewer than 110 trips per day may be assumed to cause a less-than-significant transportation impact (OPR 2018, p.12).

The OPR Technical Advisory does not address the establishment of significance thresholds for construction VMT. However, Guidelines Section 15064.3(b)(3) states: "[f]or many projects, a qualitative analysis of construction traffic may be appropriate."

Although Kings County has not yet established VMT significance thresholds for land use projects, the OPR Technical Advisory provides sufficient guidance to undertake an informational impact analysis under SB 734. Based on the requirements of CEQA Guidelines Section 15064.3(b), as elaborated upon by OPR in the corresponding Technical Advisory, the following significance thresholds for VMT are applicable for purposes of this analysis:

Construction VMT – Significance is to be determined through a qualitative analysis that considers estimated construction VMT as compared with Countywide VMT, and also considers pre-project traffic conditions on the roadways that would be most affected by construction traffic.

Operational VMT – Any project that generates operational traffic volumes of less than the screening threshold of 110 trips per day is presumed to have a less-than-significant transportation impact. Any project that generates 110 daily trips or more shall be quantitatively evaluated for VMT impacts.

Less-than-Significant Impact. The potential VMT impacts associated with construction and operation of the Grape Solar Project are discussed in turn below.

Construction

The Grape Solar Project would be constructed over a period of 14 months during which time construction traffic volumes would fluctuate depending on the construction phase. It is estimated that the average daily VMT generated by all worker trips and truck deliveries during project construction would be approximately 32,355 miles per day (i.e., 9,868,247 vehicle miles / 305 construction days). In comparison, the average VMT for Kings County in 2015 (the most recent year for which VMT data is available) was 3,992,787 miles per day (KCAG 2018b, p. 4.12-6). Thus, the daily VMT generated during construction of the Grape Solar Project would be equivalent to 0.8 percent of average daily VMT in Kings County. (The actual project-related VMT occurring in Kings County would be substantially less considering that much of the project VMT would occur outside Kings County.) This very small increment in VMT would occur only during the 14-month construction period. As discussed under item 'a)' above, the roadways that would be most affected by project construction traffic (i.e., roadways subject to 40 daily construction trips or more) would all continue to operate well within their design capacities (as indicated by the applicable LOS standards) with the addition of project construction traffic, even during the 6-week period of peak construction activity.

In summary, the above qualitative analysis shows that the VMT generated by project construction would be very low compared to overall Countywide VMT, and would only occur temporarily during project construction. The project construction traffic would have a minor short-term effect on local roadways, which would all have substantial remaining traffic carrying capacity during the 14-month project construction period. The greenhouse gas emissions from project construction would be relatively small, and the Grape Solar Project would result in a substantial net benefit in terms of greenhouse gas emissions since it would offset emissions from a fossil-fueled generating plant of equivalent capacity (see Section *4.8. Greenhouse Gas Emissions*). Given the relatively low VMT generated during project construction, and considering that the Grape Solar Project would help the State achieve its greenhouse gas reduction goals, and would thus advance the specific purpose of SB 734, the project would not conflict with or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b). Therefore, the project construction traffic impact under this significance criterion would be *less than significant*.

Operations

As discussed under item 'a)' above, traffic generated during project operations would be very light. No permanent staff would be stationed at the solar facility, although operations and maintenance contractors would visit the project on a regular basis to perform inspections, maintenance and repairs. On average, it is estimated that about 10 daily round trips (i.e., 20 trip ends or trips) would be generated by the workers on any given day. This is substantially below the screening threshold of 110 trips per day or less recommended by OPR's Technical Advisory as the volume of daily trips that may be assumed to have a less-than-significant transportation impact. Therefore, the operation of the Grape Solar Project would not conflict with or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b), and the impact under this significance criterion would be *less than significant*.

c) Would the project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Less-than-Significant Impact with Mitigation Incorporated. The Grape Solar Project would have two driveway entrances Nevada Avenue. The new entrances would result in turning movements in and out of the project site which would increase the potential for interaction with traffic along this County road. However, the project entrances would be designed in accordance with the *Kings County Improvement Standards,* and would be subject to prior design review and approval by the Kings County Public Works Department. Project egress would be controlled by stop signs, and sight-lines would be very good in all directions given the flat terrain, absence of visual obstructions, and linear alignment of Nevada Avenue. Thus the potential traffic hazard resulting from the project would generally be small, particularly during project operations when the solar facility would generate very little traffic on this very lightly traveled County road.

As discussed above, the volume of traffic generated by the project would be greatest during the construction and decommissioning phases. This would include regular deliveries of materials and equipment by large trucks. Slow moving trucks could result in temporary congestion near the project entrance, and could pose a safety concern due to abrupt changes in the speed of traffic flow, or due to slow turning movements across on-coming lanes of traffic. Delivery truck traffic could also interact with the slow moving farm equipment and vehicles utilizing the roadway. The implementation of the Mitigation Measure TR-1 below would reduce the potential impact from safety hazards due to construction and decommissioning traffic to a *less-than-significant* level.

> ***Mitigation Measure TR-1: Traffic Safety Measures for Solar Project Construction.*** *As a condition of project approval, and prior to the issuance of encroachment permits, the applicant shall consult with the Kings County Public Works Department regarding construction activities that may affect area traffic (such as equipment and supply delivery necessitating lane closures, trenching, etc.). Additionally, the project plans will be reviewed by the appropriate County departments for conformance with all applicable fire safety code and ordinance requirements for emergency access. The contractor shall implement appropriate traffic controls in accordance with the California Vehicle Code and other state and local requirements to avoid or minimize impacts on traffic. Traffic measures that shall be implemented during construction and decommissioning activities include the following:*
>
> a. *Construction traffic shall not block emergency equipment routes.*
>
> b. *Construction activities shall be designed to minimize work in public rights-of-way and use of local streets. As examples, this might include the following:*
>
>   i. *Identify designated off-street parking areas for construction-related vehicles throughout the construction and decommissioning periods.*
>
>   ii. *Identify approved truck routes for the transport of all construction- and decommissioning-related equipment and materials.*

iii. Limit the employee arrivals and departures, and the delivery of equipment and materials, to non-peak traffic periods (e.g., avoid unnecessary travel from 7 to 9 AM and 4 to 6 PM).

iv. Provide for farm worker vehicle access and safe pedestrian and vehicle access.

v. Provide advance warning and appropriate signage whenever road closures or detours are necessary.

c. Construction shall comply with San Joaquin Valley Air Pollution Control District standards for unpaved roads, which include a requirement to keep vehicle speeds below 15 miles per hour.

Since the precise nature and timing of construction and decommissioning activities requiring the traffic safety measures set forth in Mitigation Measure TR-1 cannot be predicted as of this writing, the details of the traffic safety mitigations will be determined by the County Public Works Department at the such time as the activities for which they are required are scheduled and the applicant's construction contractor requests consultation regarding such activities.

d) Would the project result in inadequate emergency access?

The Health and Safety Element of the 2035 Kings County General Plan designates evacuation routes to be relied upon for emergency or disaster responses. Within the project area, the primary evacuation routes include SR-41 and SR-198, and the secondary evacuation routes include Avenal Cutoff Road, Laurel Avenue and Kansas Avenue (Kings County 2010e).

Less-than-Significant Impact with Mitigation Incorporated. The Grape Solar Project will have its main project entrances on Nevada Avenue, which is not a County-designated emergency evacuation route but will nevertheless serve as a critical evacuation route for the Grape Solar Project itself. This route would remain open throughout construction, and emergency access would not be limited by construction activities at the project site. As required under Mitigation Measure TR-1, the applicant would be required to coordinate with the County Public Works Department regarding construction-related activities that may affect traffic on these roadways, and specifically to prevent blockage of emergency equipment routes.

The project will include an internal system of driveways and aisleways to provide adequate emergency access throughout the project. The project plans will be reviewed by the appropriate County departments for conformance with all applicable fire-safety code and ordinance requirements for emergency access. Therefore, with the implementation of Mitigation Measure TR-1, the Grape Solar Project would result in *a less-than-significant impact* with respect to adequacy of emergency access.

REFERENCES – TRANSPORTATION

Caltrans 2002	California Department of Transportation (Caltrans). 2002. *Guide for the Preparation of Traffic Impacts Studies*. http://www.dot.ca.gov/hq/tpp/offices/ocp/igr_ceqa_files/tisguide.pdf
Caltrans 2013	California Department of Transportation (Caltrans). 2013. *State Route 41 Transportation Concept Report.* July. https://dot.ca.gov/caltrans-near-me/district-6/district-6-programs/d6-transportation-planning/d6-planning-tcrs
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Fresco COG 2013	Fresno Council of Governments (Fresno COG). 2013. *Fresno County Regional Traffic Monitoring Report.* April. https://www.fresnocog.org/wp-content/uploads/publications/Modeling/TrafficCountReport_2007-2012.PDF
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KCAG 2018a	Kings County Association of Governments (KCAG). 2018. *2018 Kings County Regional Transportation Plan (RTP), Adopted*. August. https://www.kingscog.org/rtp_adopted
KCAG 2018b	Kings County Association of Governments (KCAG). 2018. *Draft Supplemental Environmental Impact Report - 2018 Kings County Regional Transportation Plan and Sustainable Communities Strategy Adopted*. June. https://www.kingscog.org/rtp_adopted
Kings County 2010d	County of Kings. 2010. *2035 Kings County General Plan – Circulation Element*. January. http://www.countyofkings.com/home/showdocument?id=3116
Kings County 2010e	County of Kings. 2010. *2035 Kings County General Plan – Health and Safety Element*. January. https://www.countyofkings.com/home/showdocument?id=13515
OPR 2018	Governor’s Office of Planning and Research (OPR). 2018. *Technical Advisory on Evaluating Transportation Impacts in CEQA*. December. https://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf

4.18. TRIBAL CULTURAL RESOURCES

Would the project:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant	No Impact
a) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code § 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American Tribe, and that is:				
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code § 5020.1(k), or	☐	■	☐	☐
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code § 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code § 5024.1, the lead agency shall consider the significance of the resource to a California Native Tribe.	☐	■	☐	☐

Introduction

Assembly Bill 52 (AB 52) provides protections for tribal cultural resources. As of July 1, 2015, all lead agencies approving projects under CEQA are required, if formally requested by a culturally affiliated California Native American Tribe, to consult with such tribe regarding the impacts of a project on tribal cultural resources prior to the release of any negative declaration, mitigated negative declaration (MND) or a notice of preparation (NOP) for an environmental impact report (EIR). Under Public Resources Code (PRC) Section 21074, tribal cultural resources include site features, places, cultural landscapes, sacred places or objects that are of cultural value to a tribe that are eligible or listed on the California Register of Historical Resources (CRHR) or a local historic register or that the lead agency has determined to be a significant tribal cultural resource.

Tribal consultation is to continue until mitigation measures are agreed to, unless the tribe or the lead agency concludes in good faith that an agreement cannot be reached. In the case of agreement, the lead agency is required to include the mitigation measures in the environmental document along with the related Mitigation Monitoring and Reporting Program (MMRP)(see PRC Section 21084.3). If no agreement is reached, the lead agency must still impose all feasible measures necessary for a project to avoid or minimize significant adverse impacts on tribal cultural resources (PRC Section 21084.3).

Setting

A complete discussion of the cultural resources setting is provided in Section *4.5. Cultural Resources. A*s discussed in Section 4.5, archival research and reconnaissance of the Grape Solar Project by Basin Research Associates indicated that no significant archaeological resources are present within the project site or immediately surrounding areas.

The Native American Heritage Commission (NAHC) was contacted concerning resources listed on the *Sacred Lands Inventory*. The results of the NAHC record search were negative, indicating no record for the presence of Native American Sacred Lands in the immediate project area.

The majority of the lands in the study area have been disturbed by agricultural activities, which may have disturbed or destroyed archaeological resources at or near the ground surface. However, it is possible that intact archaeological resources may be buried below the disturbed upper layer of soil. If so, the excavation associated with Grape Solar Project could expose as-yet undetected resources. It is also possible that human remains could be encountered as human remains have been associated with several of the prehistoric archaeological resources along the former Tulare Lake shoreline located to the southeast of the project site.

Environmental Evaluation

a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code § 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American Tribe, and that is:

i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code § 5020.1(k), or

Less-than-Significant Impact with Mitigation Incorporated. To date, no National Register of Historic Places or California Register of Historical Resources eligible or listed historic properties/cultural resources, and no known ethnographic, traditional or contemporary Native American use areas and/or other features of cultural significance have been identified in or adjacent to the Grape Solar Project site.

Since the adoption of AB 52 in 2015, no California Native American Tribes have requested in writing to be listed on Kings County's AB 52 project notification list. Therefore, no tribes were consulted pursuant to AB 52, and the AB 52 consultation process with respect to the Grape Solar Project is deemed complete.

However, the County regularly coordinates with the Santa Rosa Rancheria Tachi Yokut Tribe whose traditional territory extends from the north shore of the Tulare Dry Lake westward to the foothills of the Diablo Range and includes the project site. The tribal representatives who were contacted regarding the Grape Solar Project indicated that there are no known tribal cultural resources within the project site, although there is a potential for discovery of previously unknown tribal cultural resources during site disturbance and construction of Grape Solar Project. The tribal representatives provided the County staff with recommended mitigation measures for protection of tribal cultural resources, which have been incorporated in full in Mitigation Measures CUL-1 and CUL-2 in Section *4.5. Cultural Resources*. With the implementation of Mitigation Measures CUL-1 and CUL-2, the impact to tribal cultural resources would be reduced to *less than significant.*

***Mitigation Measure*: Implement MM CUL-1 and CUL-2.**

ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code § 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code § 5024.1, the lead agency shall consider the significance of the resource to a California Native Tribe.

Less-than-Significant Impact with Mitigation Incorporated. In the event that tribal cultural resources are discovered during project site disturbance which have not previously been evaluated for significance, the Kings County Community Development Agency will evaluate the significance of the resource in cooperation with the Santa Rosa Rancheria Cultural and Historical Preservation Department, through application of the criteria for eligibility for listing on the California Register of Historical Resources. With implementation of Mitigation Measures CUL-1 and CUL-2, impacts to such potential tribal cultural resources would be reduced to *less than significant.*

***Mitigation Measure*: Implement MM CUL-1 and CUL-2.**

REFERENCES – TRIBAL CULTURAL RESOURCES

Basin 2021 — Basin Research Associates. 2021. *Cultural Resources Review Report – Grape Solar Project, Kings County, California*. January.
[Cultural Resources report is kept administratively confidential by Kings County Community Development Agency per Government Code Section 6254, subdivision (r) and Section 6452.10.]

4.19. UTILITIES AND SERVICE SYSTEMS

Would the project:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant	No Impact
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment facilities or stormwater drainage, electric power, natural gas, or telecommunications, the construction or relocation of which could cause significant environmental effects?	☐	☐	☐	■
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	■	☐
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	■
d) Generate solid waste in excess of state or local standards, in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste goals?	☐	☐	■	☐
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☐	■

Setting

A comprehensive description of the utilities and service systems setting of the Grape Solar Project is provided in the Draft PEIR on the Westlands Solar Park Master Plan and Gen-Tie Corridors Plan, which is incorporated into this document by reference pursuant to Section 15150 of the State CEQA Guidelines. The description of the overall utilities and service systems setting is found on pages 3.14-1 through 3.14-8 of the PEIR (WWD 2017c). A description of the specific conditions relevant to the Grape Solar Project is provided below.

Water Supply

Historically, agricultural water supply for crop irrigation on the project site was provided from imported surface water deliveries provided by the Westlands Water District (WWD), and augmented by groundwater pumping from agricultural wells. In the early 2000s, the lands of the project site were acquired by WWD as part of its program to remove physically impaired farmland from irrigated agriculture. Since that time, the lands of the project site have received no imported surface water or groundwater supplies for agricultural purposes. The project site continues to be dry-farmed for winter wheat and is left fallow during the dry season.

There are no agricultural wells on the project site, although an operational well is on the adjacent Chestnut Solar Project site to the north. There are no sources of potable domestic water at the project site.

Wastewater Collection and Treatment

The project site is not within or near an area served by a community wastewater collection and treatment system. For projects in rural areas of Kings County that include permanent on-site employees, the wastewater disposal needs are typically met by individual septic tank and leachfield systems which are designed, constructed, and operated in accordance with the requirements and standards of Kings County and the Regional Water Quality Control Board.

Storm Water Drainage

There are no storm drainage facilities in the project area. The existing network of irrigation canals and ditches in the project area receive some stormwater runoff from adjacent lands during intense or prolonged storm events. Under current conditions, rainfall at the Grape Solar Project site percolates into the soil with little or no runoff leaving the site. The terrain of the project site is virtually flat, with a maximum gradient of 0.2 percent. During normal rain events, runoff from impervious surfaces would be absorbed by the soil and percolate into the groundwater basin. During more intense or prolonged storm events, the ground becomes saturated and relatively small volumes of stormwater temporarily pond on the surface and gradually percolate into the ground, and some areas drain to adjacent canals and drainage ditches.

Electric Power

Pacific Gas and Electric Company (PG&E) is an investor-owned utility company that provides electrical service to the project site and most of Kings County, with the exception of a small area in the northeast corner of the County which is served by Southern California Edison (SCE). The PG&E 70-kV Henrietta-Tulare Lake subtransmission line runs through the project site along the unimproved 25th Avenue alignment, and a 12-kV distribution line runs along the south side of Nevada Avenue opposite the site.

Natural Gas

The project site is within the service area of Southern California Gas Company (SoCalGas), although there are no natural gas distribution lines in the immediate project vicinity. The nearest gas line is a high pressure natural gas transmission line that runs parallel to Avenal Cutoff Road at a distance of approximately 2.0 miles northwest of the project site.

Telecommunications

The project area is located within AT&T's service territory for land based telephone service, and also includes internet and TV connections. Comcast Xfinity provides cable, internet and phone service in the urbanized areas of Kings County. Wireless internet is available to the project area from Unwired Broadband.

Solid Waste

Solid waste collection and disposal service in Kings County is provided by the Kings Waste and Recycling Authority (KWRA). The KWRA was formed in 1998 by agreement between Kings County and the cities of Lemoore, Hanford, and Corcoran. Solid waste from the member jurisdictions is transported to the KWRA Materials Recovery Facility in Hanford where wastes are separated for recycling, composting, or landfill disposal. Commercial solid waste is collected by private contract with licensed haulers (Kings County 2010a). Used construction and demolition material is accepted at several approved facilities in the region.

In Kings County, non-recyclable materials are disposed of at the B-17 Landfill Unit of the Chemical Waste Management, Inc., Landfill, located in the Kettleman Hills south of Kettleman City on SR-41, and the Avenal Regional Landfill, located just north of urbanized area of the City of Avenal on Skyline Boulevard. The Chemical Waste Management B-17 Landfill Unit has a maximum permitted disposal rate of 2,000 tons per day, and in 2019 accepted a total of 183,998 tons, or an average of 613 tons per day (assumes landfill is open 300 days per year)(CalRecycle 2020e). The total permitted capacity of B-17 Landfill Unit is 18.4 million cubic yards, with a remaining capacity of approximately 17.5 million cubic yards, as of November 2010. (Based on annual volume of disposal since 2010 [approx. 250,000 cubic yards per year], it is roughly estimated that B-17 Land Unit had a remaining capacity of approximately 15.0 million cubic yards at the end of 2020.) The facility's estimated closure year is 2030, with the actual closure date depending on the rate of fill (CalRecycle 2020f).

The Avenal Regional Landfill has a maximum permitted disposal rate of 6,000 tons per day, and in 2019 accepted a total of 146,001 tons, or an average of 487 tons per day (CalRecycle 2020e). The total permitted capacity of Avenal Landfill is 36.3 million cubic yards, with a remaining capacity of approximately 30.3 million cubic yards, as of September 2014. (Based on annual volume of disposal since 2014 [approx. 200,000 cubic yards per year], it is roughly estimated that Avenal Landfill had a remaining capacity of approximately 29.0 million cubic yards at the end of 2020.) The facility's estimated closure year is 2042, with the actual closure date depending on the rate of fill (CalRecycle 2020f). Based on the above, it is roughly estimated that the combined remaining capacity for the Chemical Waste Management Landfill and the Avenal Regional Landfill was approximately 44.0 million cubic yards at the end of 2020.

Greenwaste is disposed at the Kochergen Farms Composting Facility, located near the intersection of Avenal Cutoff Road and 34th Avenue.

Environmental Evaluation

a) Require or result in the relocation or construction of new or expanded water, wastewater treatment facilities or stormwater drainage, electric power, natural gas, or telecommunications, the construction or relocation of which could cause significant environmental effects?

Water Treatment

During the construction and decommissioning phases, the Grape Solar Project would use untreated groundwater obtained from an existing nearby agricultural well. During project operations, imported (untreated) surface water would be obtained from the Westlands Water District for maintenance activities and panel cleaning. During construction, project operations, and decommissioning, drinking water would be provided by bottled water delivered by truck. Shortages of untreated well water or surface water supplies to meet project demands during construction, operations, or decommissioning are not currently foreseen. However, in the unlikely event that such unforeseen shortages may occur in the future, possibly in the event of a prolonged severe drought, the relatively small volumes of untreated water that would be temporarily required during the construction, operations, and decommissioning phases would be purchased from alternative sources and trucked to the site. Therefore, no new or expanded water treatment facilities are planned or required for the project which could cause significant environmental effects. (See item 'b' below for a detailed discussion of water supply.)

Wastewater Treatment

The Grape Solar Project will include an O&M building with sanitary facilities for workers who will regularly be on-site for routine inspection, maintenance, and repair tasks. These sanitary facilities will be connected to an adjacent septic tank and leachfield system. Septic systems are regulated under the Kings County Plumbing Code, which sets forth design criteria and standards for their installation. The general requirements for septic leachfield design are provided on County's "Septic Tank Absorption Map," which classifies the County soils into four broad categories and indicates general specifications for the number of square feet of leaching area required for each 100 gallons of septic tank capacity for each soil category. Most of the project site is mapped as Soil Type "B" which requires 60 square feet of leaching area for each 100 gallons of septic tank capacity. An approximately 100-acre area in the northeast corner of the project site is mapped as an area where an engineered septic system would be required due to the presence of perched groundwater conditions (Kings County 2001). The O&M building and associated septic tank and leachfield for the Grape Solar Project are planned to be located in the south-central portion of the project site, near the intersection of Nevada Avenue and the 25th Avenue alignment. This location is well within the Soil Type "B" area and is at least one mile from the area where the County would require an engineered septic system. As such, soils in the planned leachfield area would be capable of adequately supporting the use of a septic tank for the project.

As noted previously, the daily staffing needs during project operations would vary considerably depending maintenance and repair activities required on any given day. However, it is expected that the average staff level would be approximately 10 workers per day. Based on a peak wastewater generation rate of 50 gallons per day (gpd) per person, the average peak daily volume of wastewater generated would be approximately 500 gallons. This is well below the 2,500 gpd threshold where Waste Discharge Requirement (WDRs) would be required for a small community system from the Regional Water Quality Control Board. The septic and leachfield system at the Grape Solar Project will be designed in accordance with the Kings County Plumbing Code and the Local Area Management Program (LAMP) as approved by the State Water Resources Control Board (SWRCB), and would be subject to the approval of the Kings County Community Development Agency and Environmental Health Services Division, which would ensure compliance with all applicable standards in order to avoid impacts to groundwater quality (Kings County 2016). During construction of the Grape Solar Project, sanitary needs will be provided by portable chemical toilets which will be serviced by an outside contractor as needed. Therefore, the potential wastewater treatment impacts associated with Grape Solar Project would be *less than significant*.

Stormwater Drainage

No new stormwater drainage facilities are planned to be constructed for the Grape Solar Project. Under current conditions, rainfall percolates into the soil with little or no runoff leaving the site. The terrain of the project site is virtually flat, with a maximum gradient of 0.2 percent, and the project will result in no substantial modification of existing site grades. The project will introduce very few structural elements with impervious surfaces that would impede direct percolation of rainwater into the soil. The equipment pads and small parking area would result in less than 1 percent impervious surface coverage of the site, with over 90 percent of the site retained in vegetated cover and 9 percent devoted to permeable gravel driveways. During normal rain events, runoff from impervious surfaces would be absorbed by the adjacent vegetated ground and percolate into the soil. During more intense or prolonged storm events, the ground would become saturated and relatively minor volumes of stormwater may temporarily pond on the surface and gradually percolate into the soil, as occurs under existing conditions. Due to the virtually level ground conditions, and the very minor introduction of impervious surfaces to the site by the project, the potential for stormwater to be mobilized and concentrated in sustained runoff flows is unlikely to occur. Therefore, the Grape Solar Project would not require the construction of new stormwater drainage facilities.

Electric Power

The Grape Solar Project is itself a power generating facility; however, electric service from the existing PG&E system would be required for certain project phases. During construction, the project would receive service power from the existing electrical distribution lines that run along the south side of Nevada Avenue, and would also have backup generators available on site. During project operations, the solar facility would have service power available from PG&E when the project is not powered by on-site generation. During decommissioning, the service connections to PG&E's system would remain in place until they are no longer needed. The installation and removal of electrical service connections to the project site would not result in significant environmental effects.

Natural Gas

The Grape Solar Project would not require the use of natural gas for power generation or other purposes.

Telecommunications

Telecommunications to the Grape Solar facility would likely be provided via fiber-optic cable. Alternatively, telecommunications may be conducted wirelessly, in which case a telecommunications tower approximately 70 feet tall would be included at the O&M facility. As discussed in Section *4.11. Land Use and Planning*, the tower would be located outside the 500-foot height limit zone for NAS Lemoore; but even if it was within the height restriction zone, it would still be well below the applicable 500-foot height limit. Therefore, the installation of telecommunications facilities at the project site would not result in significant environmental effects.

Conclusion

Less-than-Significant Impact. The Grape Solar Project would not require or result in the relocation or construction of new or expanded facilities for water, wastewater treatment facilities or stormwater drainage, electric power, natural gas, or telecommunications, the construction or relocation of which could cause significant environmental effects; therefore, the impact would be *less-than-significant*.

b) *Would the project have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?*

Less-than-Significant Impact. The following evaluation of water supply for the Grape Solar Project includes separate discussions of construction water and operational water.

Project Construction

As discussed in the Section *2.2. Project Description*, it is estimated that construction of the Grape Solar Project will require a total of 352 acre-feet of water, mainly for dust suppression and soil conditioning during the 14-month construction period. The average annual water demand for project construction would be 176 acre-feet per year (afy). It is anticipated that water for construction will be obtained from the agricultural well located nearby.

Current groundwater pumping in the area varies substantially from year to year depending on availability of surface water deliveries of Central Valley Project (CVP) water delivered by the Westlands Water District (WWD). During years when WWD receives most of its CVP water allocation, groundwater provides a minor portion of irrigation requirements. During periods of severe drought, as occurred from 2013 through 2016, groundwater pumping increases substantially to make up for shortfalls of surface water deliveries (WWD 2020).

In 2014, the California Legislature passed the Sustainable Groundwater Management Act (SGMA) which requires that all medium to critically overdrafted subbasins identified by the California Department of Water Resources (DWR) be managed by a groundwater sustainability agency (GSA). As the primary water purveyor and local agency within the Westside Subbasin, the Westlands Water District is the designated GSA for the subbasin. DWR designated the Westside Subbasin as a critically overdrafted basin which requires WWD to prepare a Groundwater Sustainability Plan (GSP) by January 31, 2020. On January 8, 2020, the WWD Board of Directors adopted the GSP for the 622,215-acre Westside Subbasin (which includes WWD's entire 614,700-acre service area). The GSP determined that the current safe yield for the subbasin is 270,000 acre-feet per year prior to management actions being implemented (DWR 2020a, p. ES-6). To manage groundwater during the initial years of GSP implementation, the GSA has established an interim allocation of groundwater extraction. The groundwater allocation framework is intended to manage demand by equally distributing the total annual pumping from the Subbasin on the basis of land acreage overlying the Subbasin. The groundwater allocation program includes a "transition period" from 2022 to 2030, in which a uniform annual allocation is initially established at 1.3 acre-feet per acre and then subsequently reduced each year by 0.1 AF per acre until 2030 when the allocation would reach the long-term limit of 0.5 AF per acre per year. The groundwater will be distributed based on per-acre land ownership for all qualifying lands (DWR 2020a, p. ES-13). For purposes of this analysis, the groundwater supply available to the project is defined as the long-term allocation limit of 0.5 AF per acre per year. (See Section *4.10. Hydrology and Water Quality*, item 'e', for a full discussion of WWD's Groundwater Sustainability Plan.)

The Grape Solar Project will be constructed over 14-month period, resulting in a water demand of 176 acre-feet per year (afy), or 0.1 afy per acre (assuming that the construction period is evenly divided between 2022 and 2023). This volume of groundwater pumping is well below the GSA's 0.5 afy long-term groundwater extraction limit. The Water Supply Assessment (WSA) prepared for the Grape Solar Project determined that groundwater supplies available at the site would be sufficient to meet the needs of project construction during normal, dry, and multiple dry years without adversely affecting the sustainability of the groundwater basin (WRP 2020). As such, the impact of project construction upon available water supplies would be *less than significant*.

As noted in Section *2.2. Project Description*, curtailment of groundwater pumping to meet the project demand for construction water is not currently foreseen. However, in the unlikely event that such unforeseen curtailment occurs, the relatively small volumes of untreated water that would be temporarily required during construction would be purchased from alternative sources and piped or trucked to the site.

Project Operation

During project operation, non-potable water will be required for activities such as panel cleaning, washing and rinsing equipment, and other operational uses. As described in Section *2.2. Project Description*, the combined water requirement for all operational activities is estimated to total 32.21 acre-feet annually over the 1,759-acre project site.

Operational supplies will not be obtained from groundwater wells but will be provided by Westlands Water District (WWD) through its existing system of lateral pipelines for conveyance of imported surface water from the California Aqueduct. Two of these existing WWD water distribution pipelines pass through the project site, one along the north side of Nevada Avenue, and another parallel line one mile to the north that passes through the center of the site from west to east. Under the WWD's Municipal and Industrial (M&I) Regulations, an applicant may apply for and receive up to 5 acre-feet of water for M&I use. The District has estimated that solar development requires 3 to 5 acre-feet per year per 160 acres. In order to provide adequate operational supplies for solar projects which are greater than 160-acres in size, the WWD has established an exception to the M&I limit whereby solar development would be eligible to receive up to 5 afy for each 160 acres developed. Thus the Grape Solar Project would be eligible to receive up to 55.0 afy during project operation. This would be more than sufficient to meet the estimated 32.21 afy of operational water demand for the project. Project water demand would be equivalent to 2.93 afy per quarter section (160 acres), which is well within the 5.0 afy of imported surface water per quarter section that the Grape Solar Project is eligible to receive through WWD. Therefore, surface water entitlements will be sufficient to meet the project's operational needs. As such, the impact of project operations upon available water supplies would be *less than significant*.

In the event that the project is periodically unable to obtain all or a portion of its required surface water supplies, such as during a severe prolonged drought, the project would be expected to obtain operational water from groundwater sources. The 32.21 afy of operational water demand would be equivalent to 0.018 afy per acre, which is far less than the GSA's long-term groundwater extraction limit of 0.5 afy per acre. Therefore, the groundwater available to temporarily augment surface water supplies would be sufficient to meet the operational needs of the project. In the unlikely event that such backup groundwater supplies to the project were also curtailed, the relatively small volumes of untreated water required for project operations would be purchased from alternative sources and piped or trucked to the site. As such, the impact of project operations upon groundwater resources would be *less than significant.*

Project Decommissioning

Untreated water would be required during decommissioning, although the volume of water required is expected to be less than required during the construction phase. Since vegetative cover would be maintained on the site during deconstruction, there would be relatively little exposed soil that would require watering for dust suppression. Similarly, water would not be required for soil conditioning as it is during initial site grading. The source of water during decommissioning is expected to be from an existing agricultural well nearby. The total groundwater pumped during decommissioning is expected to be substantially less than the estimated 352 acre-feet required during project construction. Even assuming that water demand during decommissioning would be same as during construction, this would represent an average volume of about 0.2 af per acre over the 1,759-acre project site. Assuming decommissioning would require one year or less to complete, this would result in a water consumption rate of 0.2 afy per acre. Since this would be substantially less than the GSA's long-term groundwater extraction limit of 0.5 afy per acre, the project water demands during decommissioning would not result in overpumping or exceedance of the safe yield of the groundwater basin.

As discussed for project construction above, curtailment of groundwater pumping to meet the project demand for water during the decommissioning phase is not currently foreseen. However, in the unlikely event that such unforeseen curtailment occurs, the relatively small volumes of untreated water that would be temporarily required during the decommissioning phase would be purchased from alternative sources and piped or trucked to the site.

In summary, the groundwater and surface water supplies available for project construction, operation, and decommissioning are sufficient to meet the needs of the project without new or expanded entitlements to water. Therefore, the impact of the Grape Solar Project upon available water supplies would be *less than significant*.

Reasonably Foreseeable Future Development

The water supply impacts associated with reasonably foreseeable development are addressed in Section *4.21. Mandatory Findings of Significance*, item 'b' (cumulative impacts). As discussed, there are a number of reasonably foreseeable cumulative solar projects in Kings County. With respect to water supply, each cumulative solar project would require water during construction and operation. The demand for water at each site would be highest during construction for purposes of dust control and soil conditioning. For most cumulative projects, construction water would be supplied by existing agricultural wells in the area. It is estimated that construction water demand for each project would be about 0.1 afy per acre, similar to that for the Grape Solar Project. As mentioned, the GSA's long-term groundwater extraction limit is 0.5 afy per acre. Therefore, even if the other cumulative projects in the vicinity were constructed concurrently with the Grape Solar Project, the groundwater pumping rate would be below the GSA's long-term extraction limit of 0.5 afy per acre in each case, such that the cumulative impact of groundwater pumping during construction would be also less than significant.

The operational water supplies for each project would be mainly used for panel washing. As discussed in in Section *4.10. Hydrology and Water Quality*, operational water demands for the proposed project are estimated to be approximately 0.018 afy per acre, or about 18 percent of annual construction water demands. As discussed above, the Grape Solar Project's operational demands would be met from imported surface water delivered through Westlands Water District, although there is a possibility that well water may be utilized as backup supply during times of drought when there may be shortages of imported water. Assuming that the cumulative projects in the project's groundwater basin, including the Grape Solar Project, all rely solely on well water for operational needs, the cumulative operational water demands of about 0.018 afy per acre would be substantially below the GSA's long-term groundwater extraction limit of 0.5 afy per acre. Thus, groundwater supplies would be available to serve reasonably foreseeable future development during normal, dry, and multiple dry years, without adversely affecting the sustainability of the groundwater basin. Therefore, the impact to water supplies from the operation of the Grape Solar Project and other reasonably foreseeable future development would be *less than significant*.

c) Would the project result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

No Impact. As discussed above, the wastewater from the Grape Solar Project would be conveyed to an on-site septic tank and leachfield system for on-site treatment and disposal. The project septic system would be designed in accordance with the absorptive capacity of the underlying soil, in accordance with Kings County standards, and subject to approval of the Kings County Community Development Agency and Environmental Health Services Division, which would ensure effective functioning of the septic and leachfield system and avoid impacts to groundwater quality (see item 'a' above for detailed discussion). Since the wastewater disposal requirements of the Grape Solar Project would be adequately served by a dedicated on-site septic system, it would not be served by community wastewater treatment provider. Therefore, the Grape Solar Project would have *no impact* on the treatment capacity of a wastewater treatment provider.

d) Would the project generate solid waste in excess of state or local standards, in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste goals?

Less-than-Significant Impact. The development of Grape Solar Project would temporarily generate construction waste during the development phase, and would generate solid waste during operation of the solar facility, and also during the decommissioning phase. The solid waste impacts during the construction, operational, and decommissioning phases of the project are discussed in turn below. [Note: The following discussion is focused on non-hazardous waste only. Hazardous waste disposal including disposal of damaged or defective solar modules is addressed in Section *4.9. Hazards and Hazardous Materials*.]

Construction Phase

During construction of the solar facility, the waste generated would primarily consist of non-hazardous waste materials such as packing containers and materials, waste lumber, wood pallets, scrap metal, glass and paper. (Since site clearing would involve mulching or plowing under of crop remnants, it is anticipated that minimal greenwaste would be generated.) Based on construction waste generation rates at a similar solar PV project in northern Los Angeles County, the construction of the Grape Solar Project is estimated to generate approximately 26.5 cubic yards (cy) of construction waste per MW of installed generating capacity (LA County 2010, p. 4-51). [1 cubic yard (cy) of construction waste is equivalent to approximately 1 ton of construction waste (CalRecycle 2020a).] Thus construction of the 250 MW solar facility would generate approximately 6,625 tons (or cy), or 22.08 tons per workday on average (over the 14-month construction period [305 work days]). Much of the construction waste materials would be reusable (e.g., wood pallets and packing crates), or recyclable (e.g., scrap metal, paper, glass), and doing so has been shown to be cost effective (CalRecycle 2020b). It is assumed that 65 percent of the construction waste would be recycled as required under the CALGreen Code (CBSC 2019). Thus approximately 2,319 tons (7.6 tons per day) of construction waste from the project would be disposed of at a Class III landfill. Assuming that all of the non-recycled waste would be hauled to either the Chemical Waste Management Landfill or the Avenal Regional Landfill, the 7.6 tons of daily construction waste generated by the project would represent about 0.69 percent of the current the combined daily average solid waste disposal (approx. 1,100 tons per day) at the two landfills. Thus if all of project construction waste was disposed at Chemical Waste Management Landfill, the solid waste accepted at the landfill would remain well below its 2,000 ton per day permitted limit. Similarly, if all of project construction waste was disposed at Avenal Regional Landfill, the solid waste accepted at the landfill would remain well below its 6,000 ton per day permitted limit. Additionally, the total 2,319 tons (or 2,319 cy) of non-recycled construction waste generated during the construction period would represent 0.015 percent of the approximately 15.0 million cy of remaining capacity of the Chemical Waste Management Landfill, or 0.008 percent of the approximately 29.0 million cy of remaining capacity of the Avenal Regional Landfill, or approximately 0.005 percent of the combined remaining capacity at both landfills. Both the daily disposal rate and the total construction waste generated by the project would represent small increases in solid waste accepted at these Kings County landfills.

Operational Phase

During operation of the Grape Solar Project, the non-hazardous waste generated would include typical refuse generated by workers such as scrap metal and machine parts, broken or defective electrical components, oily rags, packing material from deliveries, paper, cardboard, plastic, empty containers, and miscellaneous solid waste. The solar facility operator would contract with a commercial waste collection service which would haul the waste to the Kings Waste and Recycling Authority Material Recovery Facility in Hanford for sorting and recycling and/or transport of the non-recyclable waste to a local landfill site.

Based on operational solid waste generation rates at a similar solar PV project in northern Los Angeles County, the Grape Solar Project is estimated to generate approximately 0.9 cubic yards (cy) of solid waste per year per MW of installed generating capacity (LA County 2010, p. 4-53). [Approximately 4 cubic yards (cy) of uncompacted solid waste from commercial/industrial sources is equivalent to approximately 1 ton of municipal solid waste (USEPA 1997).] Upon full operation, the project would generate a total of approximately 225 cubic yards, or approximately 56.25 tons of non-hazardous solid waste per year. Assuming that at least 50 percent of the solid waste would diverted through recycling, the remaining 28.13 tons (112.5 cy) of uncompacted solid waste from the project would be disposed of at a Class III landfill per year. At the landfill, in-place compaction would reduce the volume by 66 percent, resulting in 38.25 cy per year of utilized landfill capacity (CalRecycle 2014). The 28.13 tons of solid waste landfilled by the project annually (0.108 tons per workday) would represent a small fraction of the solid waste disposed at the Chemical Waste

Management and Avenal Landfills, which currently receive a combined average of about 1,100 tons (or 1,463 cy) per day, and which would remain well below the combined 8,000 ton per day permitted limit for both landfills. Both the daily disposal rate and the total non-hazardous solid waste generated by the operation of the Grape Solar Project would represent small increases in solid waste accepted at the Chemical Waste Management Landfill and the Avenal Regional Landfill.

The total solid waste generated by operation of project over its 25-year life that would be landfilled would be approximately 956 cy (assuming compaction and 50 percent diversion), or 703 tons. When combined with the 2,319 cy (or 2,319 tons) of construction waste generated during that period (assuming 65 percent diversion), the total landfilled solid waste from construction and operation of Grape Solar Project would be about 3,275 cy (compacted), or 3,022 tons. As discussed under 'Setting,' the combined capacity remaining at the Chemical Waste Management and Avenal Landfills is approximately 44.0 million tons. The total amount of solid waste disposed by the Grape Solar Project would represent 0.007 percent of the remaining disposal capacity, or the equivalent of about 3.3 days of the volume of solid waste currently accepted at the two landfills. Thus, the solid waste generated by the Grape Solar Project would not appreciably shorten the operating life of the Kings County landfills.

Decommissioning Phase

At the end of its useful life, the Grape Solar Facility would be deconstructed in accordance with its approved Decommissioning and Soil Reclamation Plan (DSRP). As required under the DSRP, the equipment and fixtures, such as solar modules and racking, would be recycled and reused to the extent practicable. Some materials may be returned to the manufacturer for reuse or otherwise reused on the secondary market. Waste materials that are not salvaged for reuse would be shipped to the Kings Waste and Recycling Authority's Materials Recovery Facility in Hanford, where recyclable materials would be removed. All remaining waste would then go to Chemical Waste Management Landfill or the Avenal Landfill. Assuming that the volume of landfilled solid waste from decommissioning would be similar to the solid waste generated during construction, the approximately 2,319 cy (or 2,319 tons) to be disposed would represent about 2.3 days of disposal at the two landfills at current disposal rates. It is expected that sufficient landfill capacity will be available in 25 to 30 years to accommodate this solid waste when the Grape Solar Facility is decommissioned. In the unlikely event that the Chemical Waste Management and Avenal Landfills are closed prior to the time of project decommissioning, it is anticipated that the County will have demonstrated that it has at least 15 years of remaining landfill capacity remaining in the County, as required by the California Integrated Waste Management Act (CalRecyle 2020c). All waste associated with decommissioning will be disposed of or recycled in accordance with applicable laws.

In summary, the Grape Solar Project would not result in exceedance of the local landfills' permitted daily disposal limits, and the facilities have sufficient capacity to accept solid waste generated during all phases of the project. As discussed under item 'e' below, the project would comply with all solid waste reduction requirements and would not impair their attainment. Therefore, the Grape Solar Project's impact in terms of solid waste would be *less than significant*.

e) Would the project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

No Impact. The California Integrated Waste Management Act of 1989 (AB 939) requires each city and county in California to prepare, adopt, and implement a Source Reduction and Recycling Element. Policies pertaining to solid waste, source reduction, and recycling are identified in the Kings County Integrated Waste Management Plan (Kings County 1995). A Solid Waste Management Plan (SWMP) for the Grape Solar Project will be prepared in compliance with Section 1112.B.2 of the Kings County Development Code which requires the preparation and implementation of solid waste management plans for solar voltaic electrical facilities in Agricultural Zoning Districts. The SWMP will set forth detailed guidance for the handling, storage, and disposal of solid waste generated during the construction and operational phases of the Grape Solar Project. In particular, the SWMP will provide for implementation of the State's Mandatory Commercial Recycling Statute which requires businesses that generate 4 cubic yards or more of commercial solid waste per week to arrange for recycling services. The SWMP would not address solid waste generated during project decommissioning, which will be addressed in a separate Decommissioning and Soil Reclamation Plan (DSRP) as required in Mitigation Measure AG-2, which will be carried forward as a condition of approval for the project's Conditional Use Permit.

The Grape Solar Project would generate an estimated total of 12,250 cy of solid waste during construction and operation over the 25-year life of the project. This total volume of solid waste would be reduced to 3,275 cy after recycling, reuse, and compaction in place at the Chemical Waste Management Landfill and/or the Avenal Regional Landfill. These landfill facilities are permitted by the County and inspected monthly by the Kings County Health Department, Environmental Health Services Division. Some construction waste would be recycled rather than being disposed at the landfills. As discussed above, the local landfills have sufficient capacity to accept all anticipated generated during the life of the project. The project operator would contract with a franchised waste hauler which would follow the disposal and diversion requirements of the Kings County Integrated Waste Management Plan. Project waste would be disposed of consistent with applicable federal, state, and local recycling, reduction, and waste requirements and policies. Any hazardous materials and wastes would be recycled, treated, and disposed of in accordance with the Solid Waste Management Plan to be prepared for the project, and in compliance with federal, state, and local laws. Therefore, the Grape Solar Project would have *no impact* in terms of compliance with applicable laws and regulations related to solid waste.

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4.20. WILDFIRE

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant	No Impact
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	■
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☐	■
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☐	■
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☐	■

Environmental Evaluation

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones would the project:

a) Substantially impair an adopted emergency response plan or emergency evacuation plan?

Less-than-Significant Impact. The Grape Solar Project site is not located in or near a state responsibility area or on lands classified as very high fire hazard severity zones. The map of Fire Hazard Severity Zones (FHSZ) in the State Responsibility Area (SRA) for Kings County prepared by the California Department of Forestry and Fire Protection (CAL FIRE) shows the project area as being within a Local Responsibility Area (LRA)(CAL FIRE 2007). The nearest areas mapped as being within the SRA are located southwest of State Route 33, approximately 15 miles southwest of the Grape Solar Project site. The nearest area within the SRA that is zoned as Very High Severity on the FHSZ map is located in the Diablo Range at the western edge of Kings County, at least 20 miles from the Grape Solar Project site.

CALFIRE's map of Fire Hazard Severity Zones in Local Responsibility Area (LRA) for Kings County shows the project area as being "unzoned" for fire hazard. The nearest areas within the Kings County LRA that are zoned as High Severity are located in the Kettleman Hills at least 11 miles southwest of the project site, and there are no areas in the Kings County LRA that are zoned Very High Severity (CAL FIRE 2007). The Health and Safety Element of the Kings County General Plan includes a map of Potential Fire Hazards (Figure HS – 9) which shows the major portion of the project site as being subject to "little or no threat" for potential fire, and shows minor portions of the site as being "within 2400 meters (1.5 miles) of a moderate threat" for potential fire (Kings County 2010e).

The Health and Safety Element of the 2035 Kings County General Plan designates evacuation routes to be relied upon for emergency or disaster responses. Within the project area, the primary evacuation routes include SR-41 and SR-198, and the secondary evacuation routes include Avenal Cutoff Road, Laurel Avenue and Kansas Avenue (Kings County 2010e). The primary access to the project site would be Nevada Avenue, which is not a County-designated evacuation route or emergency access route.

In summary, the Grape Solar Project is not located in or near a State Responsibility Area mapped as Very High Severity, or a high fire hazard zone designated by Kings County, and is not on an evacuation route as designated by the County. Therefore, the Grape Solar Project would not impair an adopted emergency response plan or emergency evacuation plan, and the impact would be *less than significant.*

b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

No Impact. Since the Grape Solar Project is not in or near a State Responsibility Area or on or near lands classified as Very High Fire Hazard severity zones, this significance criterion does not apply and there would be *no impact*.

c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

No Impact. Since the Grape Solar Project is not in or near a State Responsibility Area or on or near lands classified as Very High Fire Hazard severity zones, this significance criterion does not apply and there would be *no impact*.

d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

No Impact. Since the Grape Solar Project is not in or near a State Responsibility Area or on or near lands classified as Very High Fire Hazard severity zones, this significance criterion does not apply and there would be *no impact*.

REFERENCES – WILDFIRE

CAL FIRE 2007	California Department of Forestry and Fire Protection (CAL FIRE). 2007. *Fire Hazard Severity Zones Maps*. November. https://osfm.fire.ca.gov/divisions/wildfire-planning-engineering/wildland-hazards-building-codes/fire-hazard-severity-zones-maps/
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4.21. MANDATORY FINDINGS OF SIGNIFICANCE

		Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant	No Impact
a)	***Does the project have the potential to 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?***	☐	■	☐	☐
b)	***Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a 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.)***	☐	■	☐	☐
c)	***Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?***	☐	■	☐	☐

Environmental Evaluation

a) Does the project have the potential to 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?

Less-than-Significant Impact with Mitigation Incorporated. As discussed in Section *4.4. Biological Resources*, the Grape Solar Project could result in potentially significant effects to several species including San Joaquin kit fox, burrowing owl, Swainson's hawk, migratory birds, and American badger. However, with the implementation of Mitigation Measures BIO-1 through BIO-5, these potential impacts would be reduced to *less-than-significant* levels. The Grape Solar Project would have no impact or a less-than-significant impact on all other species and biological communities.

As discussed in Section *4.5. Cultural Resources*, the Grape Solar Project could result in potentially significant effects to historic and prehistoric archaeological resources, including human burials. However, with the implementation of Mitigation Measures CR-1 and CR-2, these potential impacts would be reduced to *less-than-significant* levels.

In summary, with the implementation of mitigation measures to be incorporated into the Grape Solar Project, it is expected that the project would not have the potential to 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 pre-history.

b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a 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.)

Less-than-Significant Impact with Mitigation Incorporated. This discussion considers the potential impacts of the Grape Solar Project combined with the incremental effects of other past, present, and probable future projects in the vicinity. These cumulative projects comprise those included on Kings County's November 2020 list of pending and approved solar projects. These cumulative projects are listed in Table 12, on the next page, and shown in Figure 10. It is noted that all of the projects on listed in Table 12 comprise solar PV generating facilities. Most other projects that have been proposed and approved in Kings County over the past several years have consisted of minor projects such as cell towers, or projects with temporary or infrequent operation (e.g., Kelly Slater's Surf Ranch), or projects that are too far from the project area to contribute to any cumulatively significant effect (e.g., relocation of Baker Commodities facility east of Hanford; biogas pipeline projects and Pittman poultry farm projects in eastern Kings County, and Jackson Ranch Specific Plan in southern Kings County), or projects for which development applications have been formally withdrawn or closed due to inactivity (e.g., Quay Valley new community project). As such, these projects were not included on the list in Table 12 since there is no potential that they would contribute to a cumulatively significant impact associated with the Grape Solar Project.

The approach to assessing the significance of a cumulative project impact is based on the provision of Section 15065 of the CEQA Guidelines which states that the effects of a project must be "cumulatively considerable" to be considered significant. CEQA requires a two-step analysis for cumulative impacts, with the first step resulting in a determination of the significance of a cumulative impact for each environmental topic, and the second step resulting in a determination of whether the project contribution is cumulatively considerable. An affirmative finding is required for both steps in order to conclude that a project impact is cumulatively significant.

The following is an evaluation of cumulative impacts by environmental topic area. This discussion is followed by a more general evaluation of the cumulative impacts of the currently proposed and approved projects when considered together with the long range cumulative impacts resulting from implementation of the Westlands Solar Park Master Plan and Gen-Tie Corridors Plan, which is considered by Kings County to be a probable future development under CEQA.

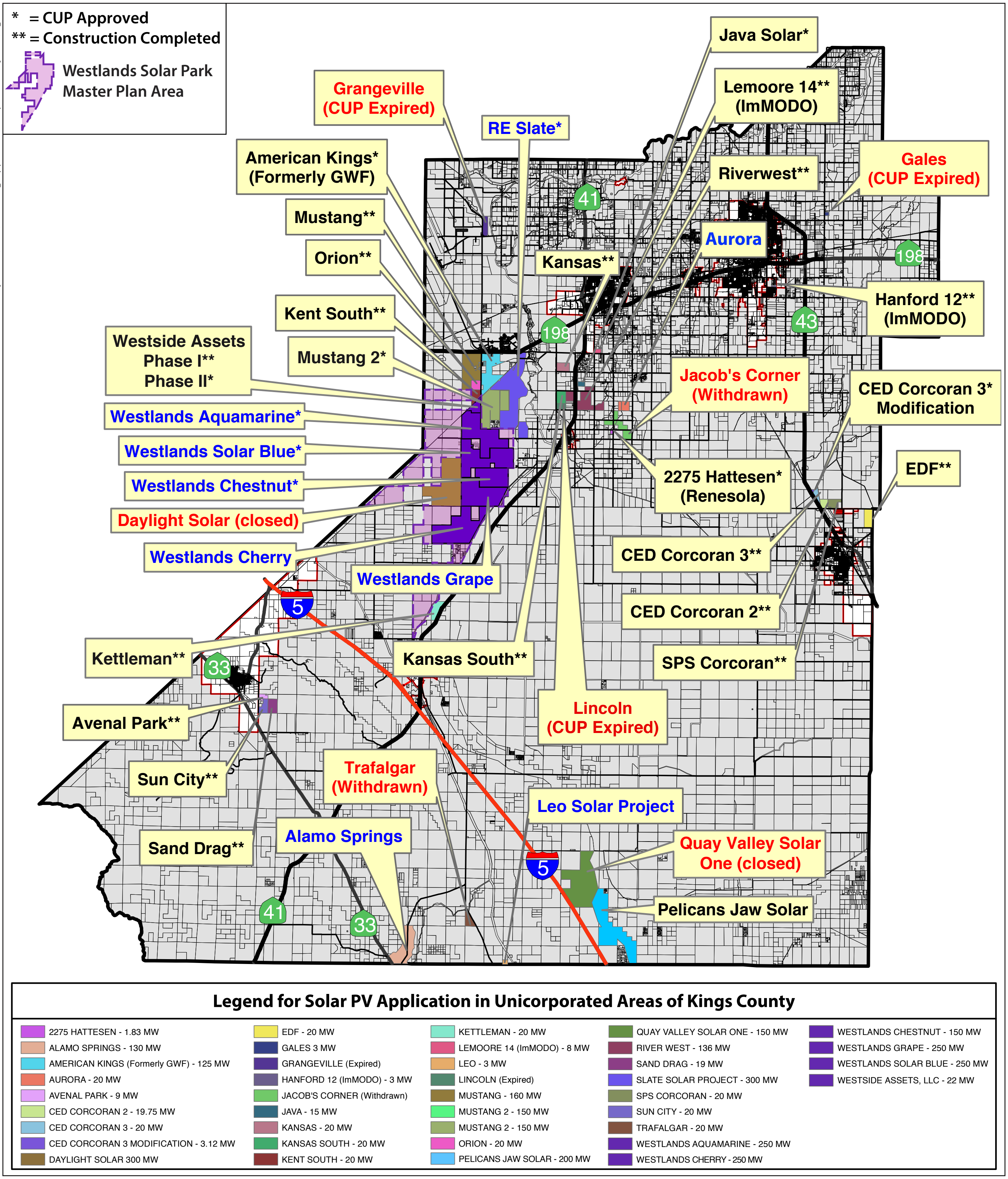
TABLE 12
PENDING, APPROVED, AND COMPLETED SOLAR PV PROJECTS

Project	Acreage	Generating Capacity (MW)	Status (As of 11/25/20)
Sun City	180	20	Constructed
Sand Drag	240	19	Constructed
Avenal Park	86	9	Constructed
CED Corcoran Solar 2	124	20	Constructed
SPS Corcoran	228	20	Constructed
American Kings (former GWF)	978	125	Constructed
Sunpower Henrietta (Riverwest)	836	136	Constructed
Kansas South	230	20	Constructed
Kansas	200	20	Constructed
Mustang	1,422	160	Constructed
Corcoran ID (EDF)	200	20	Constructed
Orion	200	20	Constructed
Kent South	200	20	Constructed
Kettleman	220	20	Constructed
Freshwater (PG&E)	160	20	Constructed
CED Corcoran Solar 3	138	20	Constructed
Hanford 12 (ImMODO)	19	3	Constructed
Westside Solar Project*	208	25	Phase 1 Constructed
Lemoore 14 (ImMODO)	60	8	Constructed
Java Solar	96	15	Constructed
Mustang 2	1,450	150	Constructed
Leo Solar	20	5	CUP Approved
Alamo Springs	985	130	Pending
Westlands Aquamarine*	1,825	250	Under Construction
CED Corcoran Solar 3 (Modification)	17	3	Constructed
Slate	2,490	300	Under Construction
Westlands Solar Blue*	1,895	250	CUP Approved
Westlands Chestnut*	1,080	150	CUP Approved
Westlands Grape*	1,759	250	Pending
Westlands Cherry*	2,137	250	Pending
Pelicans Jaw	2,127	200	Pending
Totals	**21,810**	**2,658**	

* Projects located within Westlands Solar Park.

Source: Kings County CDA, November 2020.

Cherry Solar (2019)/Pending Approved Completed Projects (Fig 10)



Source: Kings County Community Development Agency, November 2020

Pending, Approved, and Completed Solar Projects

Figure 10

Aesthetics

The Grape Solar Project and the other cumulative solar projects are generally located in areas with relatively low visual quality and without significant scenic resources in their vicinities. While the solar generating facilities would represent a visual change to the predominantly agricultural character of their settings, the low profile of the solar facilities would not be out of scale with their rural surroundings. Given also the very low number of visual receivers in the vicinities of the cumulative projects, the visual impacts resulting from each individual solar project would be less than significant.

Most of the cumulative projects are dispersed and not visible from common viewpoints. In the vicinity of the Grape Solar Project site, there are 11 other solar projects clustered along the 25th Avenue alignment. Of these, eight projects have been constructed or partially constructed, including the Kent South, Orion, Mustang, Westside, American Kings, Mustang Two, Slate and Aquamarine solar projects. Two of the remaining solar projects Solar Blue and Chestnut Solar, have been approved but not yet constructed, and one project (Cherry Solar) is pending approval. Upon full completion, all of these 11 projects and the proposed Grape Solar Project will occupy a combined area of about 13,154 acres. Overall, the low profile of the solar arrays would not be out of place in the rural setting. These projects would not be visible from any agricultural residences, the nearest of which are located over 0.25 miles east, 2.0 miles northeast, and 1.8 miles west of the combined project areas. (The nearest residence, located 0.25 miles east of the Slate Solar Project on the north side of Laurel Avenue, is surrounded by pistachio orchards which would block views of Slate and any other solar projects in the vicinity.) The American Kings and Mustang solar projects are located 300 feet south of the nearest base housing at NAS Lemoore across SR-198. This residential community is essentially urban in character and is bordered by the busy SR-198 freeway corridor on the south. The introduction of the solar arrays to the visual setting, across the freeway corridor, would represent a visual change to the southern tier of homes at the base. However, given the low profile of the solar facilities and the existing urbanized character of the NAS Lemoore residential community, and the intervening freeway corridor, this visual change would not represent a significant aesthetic impact associated with the American Kings or Mustang solar projects. None of the other cumulative solar projects in the vicinity, including the Grape Solar Project, would be visible from the NAS Lemoore base housing. As such, there would not be a cumulatively significant aesthetic impact upon the base housing from the cumulative solar projects. In summary, the incremental aesthetic effects of the cumulative projects would not combine to produce a cumulatively significant impact, and the project *contribution would not be considerable*.

All of the cumulative projects would incorporate minimum and non-intrusive lighting for security, and the solar modules at all of the cumulative projects would be non-reflective and non-glare producing. While several cumulative projects would be in proximity to each other, such as those referenced above, the combined lighting and glare from these projects would not be. Therefore, the incremental lighting from the cumulative projects would not combine to result in a cumulatively significant impact, and the project *contribution would not be considerable*.

Agriculture and Forestry Resources

Most of the cumulative projects would occupy agricultural lands that are either cultivated for row crops or used for grazing. Some of the cumulative sites are mapped as Farmland of Statewide Importance under the California Department of Conservation's Farmland Mapping and Monitoring Program. Most of the cumulative projects would incorporate dry-land farming with sheep grazing as part of their operations, while one project would incorporate crop production on a portion of its site. At the end of their productive lives, all of the cumulative solar projects, including the Grape Solar Project, would be decommissioned. All project operators would implement soil reclamation plans with financial assurances to return the sites to their pre-project conditions in accordance with mitigation measures similar to MM AG-2 and MM AG-3, as set forth for this project in Section *4.2. Agriculture and Forestry Resources*. As such, none of the cumulative projects would result in the permanent conversion of Farmland to non-agricultural uses. Likewise, none of the cumulative projects would otherwise result in the conversion of Farmland to non-agricultural use. The incremental effects from the collective operations of the solar projects upon agricultural resources would not be cumulatively significant, and the project *contribution would not be considerable*.

Most of the cumulative projects, including the proposed project, are located in agricultural zoning districts that permit solar generating facilities as a conditionally permitted use. All of the cumulative projects meet the required County Development Code requirements for conditional use permits, and also the requirements for solar facilities in agricultural zones. Therefore, none of the cumulative projects would conflict with applicable agricultural zoning. As such, there would be no cumulative impact in terms of land use plans, policies, and regulations pertaining to agriculture, and the project would make *no contribution* to such a cumulative impact.

Most of the cumulative projects, including the Grape Solar Project, are subject to Land Conservation contracts or Farmland Security Zone contracts under the Williamson Act. All of these projects would either initiate contract cancellation proceedings or would meet State and County principles of compatibility to enable solar generating facilities to occupy the contracted lands. All of the cumulative projects that elect to pursue the compatibility options, including the Grape Solar Project, would maintain sufficient on-site agricultural productivity to meet the State and County principles of compatibility under the Williamson Act, similar to that provided in MM AG-1. As such, these projects are expected to maintain active Land Conservation or Farmland Security Zone contracts for the life of the solar projects without conflicting with the Williamson Act. Thus none of the cumulative projects would individually result in significant impacts in terms of conflicting with the Williamson Act. Therefore, the cumulative impact in terms of conflicts with the Williamson Act would be less than significant, and project *contribution would not be considerable*.

In summary, the incremental impact of residual effects from the collective operations of the cumulative solar projects upon agricultural resources would not be cumulatively significant, and the project *contribution would not be considerable*.

With respect to forestry resources, there are no forest lands or lands zoned for forest land or timberland at or near any of the cumulative project sites, including the Grape Solar Project site. As such, the individual projects would have no impact on forest land. Therefore, there would be no cumulative impact on forest land and the project would *make no contribution* to such a cumulative impact.

Air Quality

With respect to regional air quality, the Air District guidance states that any project that would individually have a significant impact on regional air quality (i.e., exceed significance thresholds for ROG or NO_x) would also be considered to have a significant cumulative air quality impact. Project-specific emissions of ozone precursor pollutants (ROG and NO_x) and PM_{10} were found to be less-than-significant for the proposed project, as discussed in Section *4.3. Air Quality*. The Air District guidance also states: "[a] Lead Agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or mitigation program, including, but not limited to an air quality attainment or maintenance plan that provides specific requirements that will avoid or substantially lessen the cumulative problem within the geographic area in which the project is located" (SJVAPCD 2015c, p. 66). As discussed in Section *4.3. Air Quality*, under item 'a', the project would fulfill its share of achieving the Air District's emission reduction commitments in the PM_{10} and Ozone attainment plans through its obligation to implement emission reduction measures under the Air District's Indirect Source Rule (ISR)(Rule 9510). Therefore, the project would fully comply with the applicable air quality plans and would not conflict with or obstruct their implementation. Therefore, the project contribution to cumulative regional air quality impacts *would not be considerable*.

Local air pollutants which are relevant include PM_{10} emissions and toxic air contaminants (TACs) from construction activity. Construction period PM_{10} emissions would be localized. As shown in Table 6b, the combined construction exhaust and dust emissions from the Grape Solar Project would be less than the PM_{10} significance threshold of 15 tons with mitigation (i.e., dust controls). Since the total PM_{10} emissions would be below the total PM_{10} significance threshold, construction period total PM_{10} emissions impacts would be less than significant for the Grape Solar Project.

In evaluating cumulative PM_{10} emissions, only those projects in the immediate project vicinity are considered because PM_{10} concentrations disperse rapidly from the source. In the project vicinity, there are five other solar projects that have been approved or are pending approval but have not yet been constructed. These include the Slate Solar project located 2.5 miles northeast, the Westside Solar project (Phase 2) located 3.4 miles to the north, the Solar Blue and Chestnut Solar projects directly to the north, and the Cherry Solar Project to the south across Nevada Avenue. Depending on construction schedules, the construction of the Grape Solar Project could overlap with the construction of one or more of these nearby solar projects. However, the solar projects within the Westlands Solar Park (e.g., Westside Phase 2, Solar Blue, Chestnut, and Cherry) would be constructed consecutively, so their construction schedules would not overlap. Therefore, only the Slate solar project could potentially overlap with construction of the Grape Solar Project. (However, the Slate Solar project commenced construction in early 2021 and is expected to be completed by mid-2022, while the Grape Solar project is not anticipated to begin construction until mid-2022.) The Slate solar project is located 2.5 miles from the Grape Solar Project site at its nearest point. The nearest residential receptor that could be affected by construction at both sites is the ranch complex located 1.5 miles northeast of the Grape project site, which is 2.2 miles south of the Slate project site. Since PM_{10} concentrations disperse rapidly from the source, the PM_{10} concentrations from the Slate project would be greatly diminished by the time they combined with PM_{10} emissions from the Grape Solar Project at this common off-site receptor, such that the combined PM_{10} concentrations would be negligible. Therefore, the cumulative PM_{10} impact associated with the project would *less-than-significant*, and the project's contribution to cumulative PM_{10} emissions *would not be considerable*.

With respect to cumulative emissions of Toxic Air Contaminants (TACs), it is important to note that Diesel Particulate Matter (DPM) concentrations diminish rapidly from the source. Pollutant dispersion studies by the California Air Resources Board (CARB) have shown that there is about an 80 percent drop-off in DPM concentrations at approximately 1,000 feet from the source (CARB 2005, p. 14). This is reflected in the screening tables prepared by the Bay Area Air Quality Management District (BAAQMD) to determine setback distances where TAC exposures would be reduced to less than significant levels. For the largest construction projects, the recommended setback distance is up to 1,000 feet from the sensitive receptor location (BAAQMD 2010, p. 9). Thus multiple sources of DPM emissions must all be proximate to a receptor to have a significant additive effect to DPM concentrations at the receptor site. Since the nearest sensitive receptors to the Grape Solar Project are approximately 3,000 feet from the nearest site boundary, most DPM emissions from the project would disperse into the atmosphere before reaching the nearest sensitive receptor locations.

The SJVAPCD's TAC significance criterion for an individual project is an increase in cancer risk of more than 20 in a million persons as measured over a 70-year lifetime for the maximally exposed individual (SJVAPCD 2015b). For context, it is noted that the lifetime cancer risk from all sources is approximately 250,000 cases per million (or 1 case per 4 individuals)(SJVAPCD 2015c, p. 100). The 20 per one million significance criterion is applied to individual projects where there is a potential for a significant health impact to nearby sensitive receptors. This same significance threshold is applied by SJVACPD for cumulative TAC impacts, although the Air District considers it to be stringent (SJVAPCD 2015c, p. 110). By comparison, the CEQA Guidelines of the BAAQMD states that a project would have cumulative significant impact if there is an increased cancer risk of more than 100 cases per million persons. Under the BAAQMD guidelines, the cumulative analysis is to consider all TAC sources that are located within 1,000 feet of the proposed project, or from the location of a receptor (BAAQMD 2017, p. 5-16). [Note: The analysis of increased cancer risk includes the consideration of completed projects since TAC analyses consider the lifetime exposure of the receptors without regard to construction schedules of the projects.]

The nearest residential receptors to the Grape Solar Project site comprise the three dwellings at the nearest ranch complex located just east of SR-41 on Nevada Avenue at a distance of approximately 3,000 feet from the east project boundary. Based on TAC analyses performed on other similar-sized solar projects in the vicinity (i.e., American Kings), it is estimated that approximately 1.0 new cancer case per million would result from project TAC emissions at a receptor located 3,000 feet away, and that cancer risk at receptors at distances beyond 3,000 feet would be lower than 1.0 per million with the risk decreasing with distance from the source (Kings County 2018, p. 3-66, p. 3-94). This is well below the SJVACPD significance threshold of 20 cases per million. The nearest approved and pending solar projects which could potentially contribute TAC emissions at this receptor location are the Chestnut Solar Project, located 1.0 mile north of these ranch dwellings, the Cherry Solar Project, located 1.2 miles west of the dwellings, and the Solar Blue project located 2.0 miles north of these dwellings. (Although the Chestnut, Cherry, and Solar Blue projects are located within the Westlands Solar Park and would not be constructed concurrently with each other or the Grape Solar Project, they are included in this analysis since TAC analyses consider the lifetime exposure of the receptors without regard to construction schedule.) At these distances, the increased cancer risk from each of these three nearby projects would be less than 1.0 cancer case per million, under the reasonable assumption that meteorological conditions at the Grape Solar Project site would be very similar those prevailing at these nearby projects. Assuming for the sake of simplicity that that cancer risks for individual projects can be aggregated in absolute terms, the combined lifetime exposure from TAC emissions at the three ranch dwellings from all four projects (including Grape Solar) would be less than 4.0 cancer cases per million, which is far less than the significance threshold of 20 cases per million. Thus it is not expected the cumulative TAC emissions from all of the known and foreseeable projects in the vicinity would result in a significant increase in cancer risk at the nearest sensitive receptor subject to cumulative emissions from these nearby projects and the Grape Solar Project. Therefore, the cumulative health risk impact associated with the Grape Solar Project would be *less than significant*, and the project contribution to the cumulative health risk impact would *not be considerable*.

Biological Resources

The analysis in Section *4.4. Biological Resources* identified potential project-specific impacts to San Joaquin kit fox, burrowing owls, Swainson's hawks, migratory birds, and American badger. Mitigation measures MM BIO-1 through MM BIO-5 are specified in the event potential impacts to these species are identified at the Grape Solar Project site during project construction. The project area is not uniquely suitable for these species, and abundant habitat for these species is present on agricultural lands throughout the region. In addition, all of the other cumulative projects would be subject to similar mitigation measures in the event these species appear on any of those sites prior to construction. Thus impacts to these species would be reduced to less-than-significant levels at each cumulative project site. The combined incremental less-than-significant effects from these projects would not result in a cumulatively significant impact to these species. Therefore, the cumulative impacts to these species would not be significant, and the project *contribution would not be considerable*.

As discussed in Section 4.4, there is a potential cumulative impact to foraging habitat for Swainson's hawk. As part of its biological assessment for the Program EIR on the Westlands Solar Park Master Plan and Gen-Tie Corridors Plan, conducted in 2017, LOA completed a comprehensive analysis of potential impacts to Swainson's hawk foraging habitat associated with development of the WSP Master Plan area and all other approved, pending, and completed projects within a 10-mile radius of the WSP plan area. The analysis identified all known Swainson's hawk nests that were previously observed during surveys by LOA or others. The PEIR analysis concluded that abundant habitat would remain after full development of the WSP plan area and all other cumulative projects within this 10-mile radius, and would be more than sufficient to support all of the known Swainson's hawk nests within this radius, with surplus capacity to support additional nesting pairs. Therefore, the cumulative impact to Swainson's hawk foraging habitat was concluded to be less than significant.

As discussed in detail in Chapter 1 of this document, this MND is a subsequent CEQA document which is being tiered off the Program EIR for the WSP Master Plan and Gen-Tie Corridors Plan. As such, the biological analysis in the PEIR applies to this MND and its biological report, and is incorporated into them by reference. Therefore, the analysis and conclusions of the Program EIR with respect to cumulative impacts to Swainson's hawk foraging habitat resulting from WSP development, together with other projects within a 10-mile radius of the WSP plan area, are fully applicable to the Grape Solar Project which constitutes an individual project within the WSP Master Plan area.

In 2018, 2019 and 2020, LOA biologists updated their detailed 2017 analysis of Swainson's hawk foraging habitat within a 10-mile radius of the WSP plan area and concluded that abundant habitat would remain after full development of the WSP plan area, and all other cumulative projects (including projects proposed since 2017) within this 10-mile radius, and that this remaining foraging habitat would be more than sufficient to support all of the known Swainson's hawk nests within this radius, with surplus capacity to support additional nesting pairs. (The full analysis is contained in Appendix C of LOA's biological report, which is contained in Appendix B of this document).

LOA's 2020 updated assessment began with an inventory of known Swainson's hawk nests within a 10-mile radius of the project site. The study found that there are 37 documented nests within this radius, the nearest of which is located approximately 3.0 miles east of the Grape Solar Project site.

LOA's analysis of potential cumulative impacts to Swainson's hawk foraging habitat employed a study methodology established by Estep Environmental Consulting, and which has been applied in similar studies on previous solar projects in Kings County. The first step in this analysis is to make a determination as to the amount of surplus foraging habitat available that is not considered to be required by existing Swainson's hawks that are currently nesting in the area. Based on LOA's application of Estep's methodology, it was calculated that there is currently a surplus of 130,718 acres of suitable foraging habitat within the study area. (See LOA's Biological Assessment in Appendix B of this document for a full description of the habitat calculations.)

In order to determine the potential cumulative impacts to foraging habitat, all of the pending, approved, and completed solar projects within the study area were identified and mapped. It was determined that the 21 cumulative projects located outside of Westlands Solar Park, plus the entire WSP plan area of 20,938 acres (including the Grape Solar Project) occupy a total of 32,766 acres within the study area. For purposes of analysis, this entire acreage was conservatively assumed to comprise suitable foraging habitat, whereas the actual total would be less after subtracting acreage in tree crops and vineyards which provide little or no foraging value for Swainson's hawks.

In order to determine if this cumulative loss of foraging habitat represented a significant cumulative impact, it has been established that a reduction of surplus habitat to less than 70 percent relative to pre-project conditions would represent a cumulatively significant impact (LOA 2020). As presented in LOA's Biological Assessment (see Appendix B of this document), it was calculated that the cumulative projects would reduce the total surplus foraging habitat in the study area to 97,952 acres (i.e., 130,718 acre pre-project surplus minus 32,766 acres cumulative loss). This remaining acreage of surplus foraging area represents 74.9 percent of the pre-project total of surplus foraging area. Since the remaining surplus foraging acreage is greater than 70 percent of the pre-project surplus foraging acreage in the study area, the cumulative impact to the Swainson's hawk foraging acreage in the study area was determined to be *less than significant*. Therefore, the cumulative impact on Swainson's hawk foraging habitat would be less than significant, and the project *contribution would not be considerable*.

The Grape Solar Project site includes no <u>wetlands, jurisdictional waters, streams or riparian areas</u>, and therefore the project would have no impact upon such features and would make *no contribution* to a cumulatively significant impact to such features.

None of the cumulative projects would conflict with an applicable <u>habitat conservation plan</u> or a natural community conservation plan. As such, there would be no cumulative impact in this regard, and the project would make *no contribution* to such a cumulative impact.

In summary, the cumulative impact to biological resources would be less than significant, and the project *contribution would not be considerable*.

Cultural Resources

The probability that any previously undiscovered cultural resources are present at any of the cumulative project sites is low. However, in the event that buried cultural materials are encountered during grading or excavation, all of the cumulative projects would be subject to mitigation measures similar to those identified for the Grape Solar Project in MM CR-1 and MM CR-2 in Section *4.5. Cultural Resources*. The implementation of these measures at each cumulative site would ensure that site-specific impacts to cultural resources would be reduced to less-than-significant levels at each cumulative site. The collective incremental effects after mitigation would result in a *less-than-significant cumulative impact* to cultural resources, and the project *contribution would not be considerable*.

Energy

As discussed in Section *4.6. Energy*, the construction of the Grape Solar Project would be subject to an array of regulatory requirements related to the efficient use of fuel, use of renewable energy sources, solid waste reduction and diversion, and energy efficient building standards, among other requirements. These requirements would ensure that the Grape Solar Project and the other approved and pending projects would not result in the wasteful, inefficient, or unnecessary use of energy. Therefore, the *cumulative energy impact would be less than significant*, and the project impact would *not be cumulatively considerable*.

As is the case with the Grape Solar Project, the objective of the other cumulative solar projects is to generate renewable solar energy in order to help reduce statewide reliance on non-renewable fossil-fueled generation. The operation of the solar facilities would allow for the decommissioning of equivalent generation from natural gas fired power plants. The cumulative projects would consume a relatively small amount of electricity to operate lights and equipment, and this energy consumption would be negligible compared to the clean energy produced by the solar projects.

Geology and Soils

Potential impacts due to geologic and soils conditions tend to be highly localized and generally do not extend beyond the boundaries of a project, except for geologic effects that are regional in nature such as earthquake risk. The cumulative projects would be subject to similar geologic and soils conditions and hazards as discussed for the Grape Solar Project in Section *4.7. Geology and Soils*. While not all hazards would be present at all sites, or to the same degree, the potential hazards include seismic shaking, liquefaction, seismic settlement, and soil expansion, among other things. The vulnerability of each cumulative project to seismic and soil hazards would be subject to confirmation and detailed characterization through the completion of geotechnical investigations required prior to the development of each site. As is the case with the Grape Solar Project, it is expected that the potential seismic and geologic hazards and any adverse soil conditions at the cumulative project sites would be mitigated through building code requirements and design recommendations of geotechnical engineers for each project. The specified soil engineering measures would be expected to mitigate or avoid all potentially hazardous geologic and soils conditions to less-than-significant levels at each site. While constructing the facilities to meet the seismic design criteria of the California Building Code would not completely eliminate the potential for damage during a major earthquake, it would reduce the potential impacts to public safety and property to less-than-significant levels at the cumulative projects. Given also the unlikelihood of soils hazards extending beyond the boundaries of individual project sites, the cumulative geologic and soils impacts would be less than significant. Therefore, any incremental hazards remaining at each cumulative site after mitigation *would not result in a cumulatively significant impact*, and the *project contribution would not be considerable*.

With respect to paleontological resources, there is a low probability that any previously undiscovered paleontological resources are present at any of the cumulative project sites. This is because the surface Holocene material that covers all the cumulative sites is too recent to contain fossils, although fossils may be present at depth within the older Quaternary material. In the event that buried paleontological resources are encountered during grading or excavation, all of the cumulative projects would be subject to mitigation measures similar to those identified for the Grape Solar Project in MM GEO-1 in Section *4.7. Geology and Soils*. The implementation of these measures at each cumulative site would ensure that site-specific impacts to paleontological resources would be reduced to less-than-significant levels at each cumulative site. The collective incremental effects after mitigation would result in a *less-than-significant cumulative impact* to paleontological resources, and the project *contribution would not be considerable*.

Greenhouse Gas Emissions

As discussed in Section *4.8. Greenhouse Gas Emissions*, the project's solar generating facilities would comprise a renewable source of energy which will help displace an equivalent amount of existing fossil-based generation. The construction and operation of the Grape Solar Project would generate some greenhouse gas emissions from fossil-fueled vehicles and equipment; however, these emissions would not exceed any screening thresholds for significance and therefore would be significant at the project-specific level. Since all of the other cumulative projects would be approximately the same size as the Grape Solar Project or smaller, the GHG emissions impacts from the individual cumulative projects would likewise not be significant. Cumulatively, the GHG emissions from the approved and pending solar projects would be more than offset by the avoided greenhouse gas emissions resulting from the renewable electricity they would generate. Since the cumulative projects would facilitate the avoidance of substantial existing fossil-fueled power generation, they would individually and collectively result in a substantial net reduction in overall GHG emissions. Therefore, the *cumulative impact would not be adverse*, and the project would make *no contribution* to an adverse cumulative effect.

Hazards and Hazardous Materials

Each of the cumulative sites, including the Grape Solar Project site, would be subject to similar hazards, including potential discharges of hazardous materials during project construction and operation, and potential hazards from existing environmental conditions that may be present from past activities at the sites. In general, most potential hazards would be highly localized and not likely to extend beyond individual project sites. Each cumulative project would be required to implement an approved Hazardous Materials Business Plan (HMBP) to address potential hazardous events at the project, and also would be required to comply with all federal, state, and local laws and regulations regarding transport, handling, storage, and use of hazardous materials. Each cumulative project would also be required to identify potentially hazardous environmental conditions associated with historical uses of their respective sites through the preparation of Environmental Site Assessments, and each project proponent would be required by law to remediate or remove any identified contaminant sources from the site. The implementation of required plans and protocols relative to potential hazards and hazardous materials would reduce the associated impacts to less than significant levels at each project site. As discussed above, the impacts from hazards and hazardous materials would generally be confined to each project site and would not be given to accumulation with similar effects from other projects in the vicinity. Therefore, any incremental effects related to hazards and hazardous materials *would not result in a cumulatively significant impact*, and the *project contribution would not be considerable*.

Hydrology and Water Quality

This discussion covers potential cumulative drainage and flooding impacts, water quality impacts, and groundwater supplies.

With respect to <u>stormwater drainage</u>, the Grape Solar Project and the other cumulative projects have similar natural conditions like relatively flat topography, semi-arid climate, and lack of natural drainage courses nearby. In addition, the cumulative solar projects would all maintain over 90 percent of their sites in permeable soil with vegetated cover. Thus the relatively small amount rainfall received at each site would tend to percolate into the ground, and would not tend to leave the site or result in off-site drainage impacts. Even under major storm conditions, any off-site runoff would likely be captured by one of the many irrigation canals or agricultural drainage ditches in the area. Thus even where cumulative projects are located in proximity to each other, there is virtually no potential for runoff from several sites to combine to result in downstream drainage impacts. Therefore, the potential *cumulative stormwater drainage impacts would be less than significant*, and the project *contribution would not be considerable*.

With respect to <u>water quality</u>, during the construction of each cumulative project, including the Grape Solar Project, there is a potential for erosion of exposed soils and spills of hazardous materials that could have an adverse impact on surface water quality. However, each cumulative project would be required to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) which would specify measures to prevent and control erosion and discharges of hazardous materials. These control measures would reduce the potential water quality impacts at each cumulative site to less-than-significant levels. As discussed above, the natural and built conditions at each project site would virtually eliminate the potential for stormwater runoff to leave the site. Therefore, the potential for polluted surface water to be mobilized and leave each site is also small, and the potential for polluted surface water from several sites to result in a collective water quality impact to downstream water bodies is negligible. Therefore, the *cumulative impacts to water quality would be less than significant*, and the project *contribution would not be considerable*.

With respect to <u>flooding and inundation</u>, neither the Grape Solar Project site nor the other cumulative project sites in the vicinity of the project site are subject to flooding during a 100-year storm event, or to inundation in the event of upstream dam failure. While some cumulative projects located near the Kings River and east of the river may be subject to flooding and inundation, these projects would be required by the County to incorporate drainage control and flood protection measures to mitigate any potential impacts within the project sites and adjacent properties. As such, any cumulative flooding impacts would be reduced to less-than-significant levels with drainage and flood mitigations incorporated into the design and construction of the affected projects. Since the proposed project site is not subject to flooding or inundation, the project would *make no contribution* to any cumulative flooding impact.

With respect to groundwater supplies, each cumulative project, including the Grape Solar Project, would require water during construction and operation. The demand for water at each site would be highest during construction for purposes of dust control and soil conditioning. For most cumulative projects, construction water would be supplied by existing agricultural wells or new wells. It is estimated that construction water demand for each project would be about 0.2 acre-feet per acre. (Thus, for a project with a one-year construction schedule, water demand would equal 0.2 afy per acre; a project with a two-year construction schedule would have an average water demand of 0.1 afy per acre.) In the groundwater basin beneath the project area, the Groundwater Sustainability Agency (GSA) has established a long-term groundwater extraction limit of 0.5 afy per acre. Therefore, even if the other cumulative projects in the vicinity were constructed concurrently with the Grape Solar Project, the collective groundwater pumping rate would not exceed the GSA's goal for groundwater pumping. The operational water supplies for each solar project would mainly be used for panel washing. As discussed in in Section *4.10. Hydrology and Water Quality*, operational water demands for the Grape Solar Project are estimated to be approximately 0.018 afy per acre. Even if it is assumed that the cumulative projects in the project's groundwater basin, including the Grape Solar Project, would rely solely on groundwater for operational needs, the collective water demands would be substantially below the GSA's long-term groundwater extraction limit of 0.5 afy per acre. Therefore, the cumulative projects would not deplete groundwater supplies. In addition, since all of the cumulative projects would retain 90 percent or more of their site areas in permeable vegetated cover, the projects would not interfere with groundwater recharge, individually or collectively. Therefore, the *cumulative impact to groundwater supplies would be less than significant*, and the project *contribution would not be considerable*.

Land Use and Planning

As discussed in Section *4.11. Land Use and Planning*, the Grape Solar Project would not physically divide an established community, and would not result in significant land use impacts to surrounding properties. Similarly, none of the cumulative projects would divide existing communities, and all of the cumulative projects would result in less-than-significant land use impacts upon surrounding properties. The cumulative incremental land use impacts resulting from the collective construction and operation of the *cumulative projects would be less than significant*, and the project *contribution would not be considerable*.

The General Plan land use designations applicable to all of the cumulative projects include solar generating facilities as allowed uses. All of the cumulative projects, including the Grape Solar Project, are located either in agricultural zoning districts that permit solar generating facilities, or in commercial zoning districts that permit solar projects. All of the cumulative solar projects meet the required County Development Code requirements for conditional use permits for solar facilities. Therefore, none of the cumulative projects would conflict with applicable land use plans, policies, and regulations. As such, there would be *no cumulative impact in terms of land use plans, policies, and regulations*, and the project would make *no contribution* to such a cumulative impact.

Mineral Resources

None of the cumulative projects, including the Grape Solar Project site, have oil or gas wells on their sites, or are on or near active oil and gas fields. Therefore, the cumulative projects would not result in the loss of availability of oil and gas resources which may be present beneath the cumulative sites.

None of the cumulative projects, including the Grape Solar Project, would result in the loss of availability of other known mineral resources, such as aggregate deposits, since none exist in this part of Kings County. Additionally, the cumulative projects would not result in the loss of availability of a locally important mineral resource delineated on a local land use plan.

In summary, there would be *no cumulative impact to mineral resources*, and the project would make *no contribution* to such a cumulative impact.

Noise

As discussed in Section *4.13. Noise*, the nearest sensitive noise receptors to the Grape Solar Project site include 8 ranch dwellings located 0.5 miles to 1.5 miles east of northeast of the project site. At these distances, the maximum construction noise generated at the project site would be below the applicable County noise standards at all of these receptors. Traffic generated during project construction would result in slight increase in ambient noise levels along the affected roadways, but the increased noise levels would not exceed the County's applicable noise standards at the locations of any sensitive receptors. Noise levels generated by operational traffic would be lower.

During construction, noise generated at the Grape Solar Project site could combine with noise generated by other projects in the immediate vicinity and result in cumulatively higher noise levels. As mentioned, other solar projects within the Westlands Solar Park (e.g., Westside Phase 2, Aquamarine, Solar Blue, Chestnut, and Cherry) would not be constructed at the same time as the Grape Solar Project. The nearest other project that could be constructed in the same time-frame as the Grape Solar Project is the Slate Solar Project located at least 2.5 miles north of the Grape Solar Project site. The nearest common receptors to both projects are at the ranch complex located 1.5 miles east of the Grape project site and 2.2 miles south of the Slate project site. At these distances, the maximum cumulative noise level increase at this receptor location from both projects would be less than 1 dBA, at a combined noise level of approximately 45 dBA, which is well below the County's applicable noise thresholds. Other sensitive receptors in the vicinity that would be located at greater distances from any combined noise sources and would likewise not be subject to cumulatively significant noise increases. Therefore, the incremental noise impacts from the combined construction of the Grape Solar Project and other *cumulative projects would be less than significant*, and the project *contribution would not be considerable*.

Regarding noise from construction traffic, the most affected receptors would be the two dwellings at the Stone Land Company Ranch located 3.5 miles west of the project site on Nevada Avenue. Construction traffic from the Grape Solar Project would not result in a significant increase in noise levels at this receptor location. The only other project that could contribute construction traffic to Nevada Avenue is the Cherry Solar Project; however, since that WSP solar project would not be constructed at the same time as the Grape Solar Project, the Cherry project would not generate traffic at the same time as the Grape Solar Project. Thus the cumulative noise impact due to traffic noise would be less than significant. Therefore, the incremental traffic noise impacts from the combined construction the Grape Solar Project and other *cumulative projects would be less than significant*, and the project *contribution would not be considerable*.

During project operations, both on-site activity and related traffic would be very light and would not generate noise levels that would be audible at any receptor locations. Therefore, the incremental noise impacts from the combined operation of the Grape Solar Project and other *cumulative projects would be less than significant*, and the project *contribution would not be considerable*.

Construction activities at the cumulative projects would result in ground vibration, although such vibration would not be detectable beyond the project boundaries of each project site. Therefore, the cumulative projects would result in *no cumulative vibration impacts*, and the Grape Solar Project would make *no contribution* to such a cumulative effect.

Population and Housing

None of the cumulative projects, including the Grape Solar Project, would include a residential component so they would not directly induce population growth in the area. The construction and operational workers for the cumulative projects are expected to be drawn from the existing labor pool in the region, and thus the cumulative projects would not indirectly result in population growth. Additionally, none of the cumulative projects would result in the extension of roads or utilities to lands not currently served by urban infrastructure, and thus would not induce unplanned urban development into the rural areas of the County. Therefore, the cumulative projects would result in *no cumulative inducement of population growth* in the area, and the project would make *no contribution* to such a cumulative effect.

None of the cumulative projects currently include housing on their sites. Therefore, the cumulative projects would result in *no cumulative impacts* with respect to displacement of housing or population, and the project would make *no contribution* to such a cumulative effect.

Public Services

Fire protection services for all cumulative projects, including the Grape Solar Project, would be provided by the Kings County Fire Department. The potential demand for Fire Department services is expected to be very low at each cumulative project site. Thus the collective demand for Fire Department services is also expected to be low, and would not cumulatively result in the need for new or expanded facilities. Therefore, the *cumulative impact to fire services would be less than significant*, and the project *contribution would not be considerable*.

Police projection services for all cumulative projects, including the Grape Solar Project, would be provided by the Kings County Sheriff's Office. The potential demand for Sheriff's Office services is expected to be very low at each cumulative project site. Thus the collective demand for Sheriff's Office services is also expected to be low, and would not cumulatively result in the need for new or expanded facilities. Therefore, the *cumulative impact to Sheriff's services would be less than significant*, and the *project contribution would not be considerable*.

There would be little or no demand for other County services from the project, or from any of the other cumulative projects, and would not cumulatively result in the need for new or expanded facilities. Therefore, the *cumulative impact to other County services would be less than significant*, and the project *contribution would not be considerable*.

Recreation

Since neither the Grape Solar Project nor any of the other cumulative projects would include housing at their sites, they would not result in increased use of existing recreational facilities. Neither the project nor any of the other cumulative projects would include recreational facilities in their projects, so there would be no adverse physical effects resulting from such facilities. As such, there would be *no cumulative impact associated with recreational facilities*, and the project would make *no contribution* to such an impact.

Transportation

As discussed in Section *4.17. Transportation*, the highest rate of traffic generation from the Grape Solar Project would occur during the 6-week peak period of construction activity. As discussed, the traffic volumes generated during the peak construction period for the project would have a less-than-significant impact on the performance of affected roadways. All of the affected roadway segments have substantial unutilized traffic capacity, and operate well within acceptable service levels. During the peak construction period, the roadway segment that would be most affected by cumulative traffic (i.e., Nevada Avenue near the project entrance) would be subject to an almost 2.5-fold increase in daily traffic east of the project entrance, and a 61 percent increase in daily traffic volumes west of the project entrance, due to project construction traffic. However, due to the very low existing traffic volumes on Nevada Avenue, the service level would remain at acceptable LOS B on this roadway during the peak construction period. Other roadways in the vicinity would be subject to temporary increases of 1.5 to 12.0 percent in overall traffic volumes. These increases in traffic volume would only occur during the 6-week period of peak construction for the Grape Solar Project. The project traffic contributions would be lower during the remaining 55 weeks of construction on all affected roadways. The project construction traffic would not result in a temporary change in Level of Service or a degradation of LOS to unacceptable levels on any affected roadway segment. Therefore, the project would not conflict with a program, plan, ordinance or policy addressing the circulation system, and the impact would be less than significant.

There are five other approved and pending projects in the immediate project vicinity that have not yet been constructed, and which would potentially utilize the same roadway network as the Grape Solar Project. (These projects include the Slate Solar Project, as well as solar projects within Westlands Solar Park including Westside Phase 2, Solar Blue, Chestnut, and Cherry Solar). For purposes of this cumulative analysis, it is assumed that: 1) none of the other four projects in Westlands Solar Park would be constructed concurrently with the Grape Solar Project; and 2) the peak construction traffic from the Slate Solar Project could overlap with the peak construction traffic from the Grape Solar Project. (However, the Slate Solar Project commenced construction in early 20121 and is anticipated to be completed by mid-2022, while the Grape Solar project is not anticipated to begin construction until mid-2022.) The Slate Solar Project would have two entrances on Avenal Cutoff Road, located 5 and 7 miles north of the Grape Solar Project site, and one entrance on Laurel Avenue located 2.5 miles north of the Grape site. According to the traffic report prepared for the Slate Solar Project, all construction traffic utilizing the Laurel Avenue entrance would travel to and from the site via Avenal Cutoff Road. Thus construction traffic for the Slate project would solely utilize Avenal Cutoff Road, whereas this roadway would be unlikely to be utilized by traffic generated by the Grape Solar Project. This is mainly because there are more direct routes to the Grape Solar Project, from all potential travel origination points, than a route that would include Avenal Cutoff Road. There would be little if any overlap of traffic from the Grape and Slate solar projects on other roadways in the vicinity. For example, most construction workers for the Grape Solar Project would arrive from the north via SR-41 and most equipment and materials deliveries would arrive from the north and south via SR-41 or from the west via the Jayne-Nevada corridor. Similarly, the roadway segment that would be most affected by the Grape Solar Project – Nevada Avenue – would not receive any traffic from construction of the Slate Solar Project. In addition, the roadway segment that would receive the second highest number of daily trips from the Grape Solar Project – State Route 41 south of State Route 198 – would be utilized by few if any trips generated by the Slate Solar project (Kings County 2019b).

As discussed above, the construction traffic for the Grape Solar Project is not expected to utilize Avenal Cutoff Road (or 25th Avenue), so the Grape Solar Project would not make a cumulatively considerable contribution to any cumulative traffic impacts on those roadways. While traffic from the Grape Solar Project may be added to more distant roadway segments that would also be utilized by the Slate Solar Project (e.g., SR-41 north of SR-198; SR-198 east of SR-41), the temporary project contribution would be very minor (i.e., about 2 percent of daily traffic volumes on both highways). Assuming that the Slate Solar Project would contribute similar volumes of daily traffic on these roadways, the cumulative increase in traffic volumes would be about 4 percent on both highways. Under these conditions, the resulting daily service levels would remain at LOS B and would be well below the LOS D threshold on both highways (see Table 11 in Section *4.17. Transportation*). Since the Grape Solar Project would generate little if any traffic during the AM or PM peak periods, the project would not contribute to cumulative degradation of service levels at any intersections or ramps in the area during these critical peak travel periods. During periods of less intensive construction activity and during project operations, the cumulative traffic generation would be substantially less. Therefore, the *cumulative impact to roadway performance would be less than significant*, and the project *contribution would not be considerable*.

With regard to <u>Vehicle Miles Traveled</u>, the average daily VMT generated by the Grape Solar Project during the 14-month construction period would be equivalent to approximately 0.8 percent of the average daily VMT in Kings County. (However, it is noted that much of project VMT would occur outside of Kings County.) This small and temporary increase in Countywide VMT would not represent a significant impact. Other cumulative solar projects would contribute similarly small increases in average daily VMT in Kings County. Since the construction schedules of the cumulative projects would tend not to overlap, the maximum increase in cumulative VMT may reach the equivalent of 1.6 percent of the daily average Countywide VMT if two large solar projects were constructed concurrently. Even under these conditions, the small and temporary increase in Countywide VMT would not represent a cumulatively significant impact. During the operational phases of the cumulative solar projects, each project would generate an average of up to 20 trips per day, which is far less than 110 daily trip screening threshold recommended by the Office of Planning and Research (OPR) for determining the significance of a VMT impact. Therefore, the cumulative VMT impact would be *less than significant and the project contribution of would not be considerable*.

With respect to <u>traffic safety hazards</u>, there is a potential for creation of hazardous driving conditions during the construction periods for the cumulative projects, including the Grape Solar

Project. Large slow moving trucks could result in temporary congestion near the project entrances, and could pose a safety concern due to abrupt changes in the speed of traffic flow, or due to slow turning movements across on-coming lanes of traffic. To minimize potential traffic safety hazards, all of the cumulative projects, including the Grape Solar Project, would implement traffic control measures similar to those identified in MM TR-1 in Section 4.17 of this IS/MND for the Grape Solar Project. These measures would reduce the potential traffic safety impacts at each cumulative project site to less-than-significant levels. The remaining incremental traffic safety effects resulting from collective truck traffic at the cumulative projects would be *less than significant cumulatively*, and the project *contribution would not be considerable*.

Tribal Cultural Resources

The probability that any previously undiscovered tribal cultural resources are present at any of the cumulative project sites is low. However, in the event that buried tribal cultural resources are encountered during grading or excavation, each of the cumulative projects would be subject to mitigation measures similar to those identified for the Grape Solar Project in MM CR-1 and MM CR-2 in Section *4.5. Cultural Resources*. The implementation of these measures at each cumulative site would ensure that site-specific impacts to tribal cultural resources would be reduced to less-than-significant levels at each cumulative site. The collective incremental effects after mitigation would result in a *less-than-significant cumulative impact to tribal cultural resources*, and the project *contribution would not be considerable*.

Utilities and Service Systems

With respect to water supply, each cumulative solar project would require water during construction and operation. The demand for water at each site would be highest during construction for purposes of dust control and soil conditioning. For most cumulative projects, construction water would be supplied by existing agricultural wells. It is estimated that construction water demand for each project would be about 0.2 acre-feet per acre. (Thus, for a project with a one-year construction schedule, water demand would equal 0.2 afy per acre; a project with a two-year construction schedule would have an average water demand of 0.1 afy per acre.) In the groundwater basin beneath the project site, WWD's long-term groundwater extraction limit has been set at 0.5 afy per year. Therefore, even if the other cumulative projects in the vicinity were constructed concurrently with the Grape Solar Project, the groundwater pumping rate would not exceed the groundwater extraction limit at each project site, such that the *cumulative impact of groundwater pumping would be less than significant*, and the contribution from the Grape Solar Project would be *not cumulatively considerable*.

The operational water supplies for each project would be mainly used for panel washing. As discussed in in Section *4.10. Hydrology and Water Quality*, operational water demands for the Grape Solar Project are estimated to be approximately 0.018 afy per acre. It is expected that the project's operational demands would be met from imported surface water delivered through Westlands Water District's water distribution system, although there is a possibility that well water may be utilized as backup supply during times of drought when there may be shortages of imported surface water. Even if it is assumed that the cumulative projects located within the same groundwater basin as the Grape Solar Project would all rely solely on well water for operational needs, the cumulative operational water demands of about 0.018 afy per acre would be substantially below the long-term groundwater extraction limit of 0.5 afy per acre. Therefore, the *cumulative impact to water supplies would be less than significant*, and the project *contribution would not be considerable*.

With respect to wastewater treatment, the Grape Solar Project and other large-sized cumulative projects would include O&M facilities with septic and leachfield systems for on-site disposal and treatment of domestic wastewater. These wastewater facilities would be subject to Kings County's design and engineering requirements for septic systems, which would be tailored to each project's soil and groundwater conditions. This would ensure that wastewater generated at the cumulative project sites would not result in water quality impacts. Therefore, the *cumulative impacts with respect to wastewater treatment would be less than significant*, and the project *contribution would not be considerable*.

With respect to stormwater drainage, neither the Grape Solar Project nor any of the cumulative projects would include the construction or expansion of stormwater drainage facilities. Since over 90 percent of each project site area would be retained in pervious vegetative cover, the ability of each site to absorb and percolate rainwater through the surface soil would not be substantially altered with the addition of the solar facilities. Given also the flat topography and semi-arid conditions at the cumulative sites, the increase in the volume and velocity of stormwater runoff due to the projects would be negligible, so there would be no need to construct storm drainage systems for the projects. Therefore, *no cumulative impacts would result from the construction or expansion of storm drainage systems*, and the project would make *no contribution* to such impacts.

The total solid waste that would be generated and landfilled by the Grape Solar Project during construction and the operational life of the project would be approximately 3,275 cubic yards (compacted) or 3,022 tons. Since the Grape Solar Project represents 9.5 percent of the total power generation capacity of all of the cumulative projects listed in Table 12, the total cumulative solid waste generation by the cumulative projects would be roughly 10.5 times the project rate, for a cumulative total of 34,388 cy, or 31,731 tons. This would represent about 0.08 percent of the total combined remaining landfill capacity of approximately 44.0 million cy at the Chemical Waste Management Landfill and Avenal Regional Landfill, or the equivalent of 29 days of solid waste disposal at the current combined daily disposal rate of 1,100 tons at the two landfills. Thus the total landfilled solid waste generated by the cumulative projects over their lifetimes would shorten the combined remaining life of the landfills by about 29 days. During project construction when solid waste generation would be greatest, the Grape Solar Project would generate 22.08 tons of solid waste per workday. Assuming that all of the cumulative projects were constructed at the same time, the combined volume of solid waste disposed at the landfills would be about 232 tons per day. Thus, even under this very conservative scenario, the cumulative daily solid waste generation would remain well below the combined 8,000 ton per day permitted disposal limit at the two landfills. Thus the cumulative impact on solid waste disposal and landfill capacity would be less than significant, and the project *contribution would not be considerable*.

Wildfire

With respect to wildfire, neither the Grape Solar Project site, nor any of the cumulative project sites is located in or near State responsibility areas or on lands classified as very high fire hazard severity zones. As such, the Grape Solar Project and other approved and pending projects *would have no cumulative impact under this criterion*, and the contribution of the Grape Solar Project would *not be cumulatively considerable*.

Program-Level Cumulative Impacts Associated with the Westlands Solar Park Master Plan

As discussed in Section *2.4. Related Projects*, the Grape Solar Project is located within the Westlands Solar Park (WSP), a master planned solar complex covering approximately 20,938 acres in west-central Kings County. The WSP Master Plan and Gen-Tie Corridors Plan was prepared by the Westlands Water District (WWD) to provide policy guidance for the reuse of retired farmlands owned by WWD, which comprise approximately half of the WSP Master Plan area. In compliance with State CEQA Guidelines Section 15168, the WWD prepared a Program EIR (PEIR) (SCH No. 2013031043) which addressed the potential environmental impacts associated with future solar development under the WSP Master Plan and Gen-Tie Corridors Plan (WWD 2017c). The Draft PEIR also addressed the potential impacts associated with the planned Gen-Tie Line extending from the WSP to the interconnection point at Gates substation to the west, since the Gen-Tie Line is required for the transmission of WSP solar generation to the State electrical grid. On January 16, 2018, the WWD Board of Directors certified the PEIR under CEQA and approved the WSP Master Plan and Gen-Tie Corridors Plan as a WWD policy document.

Since the WSP Master Plan and Gen-Tie Corridors Plan PEIR evaluates the overall impacts resulting from full development of the Westlands Solar Park, it serves as a first-tier CEQA document for this IS/MND, and has been incorporated into this document by reference. The impact analysis in the PEIR provides an evaluation of the cumulative impacts of WSP buildout taken by itself, and also includes and evaluation of the long-term cumulative impacts associated with the WSP buildout combined with other cumulative development. To summarize, the PEIR concluded that the cumulative impacts of solar development under the WSP Master Plan would be less than significant, and also that the combined effects of WSP development taken together with the effects of the cumulative projects would be *less than cumulatively significant*, and that the contribution from each individual future solar project within WSP, and from the WSP as a whole, would *not be considerable*.

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

Less-than-Significant Impact with Mitigation Incorporated. The ways in which people can be subject to substantial adverse effects from projects include: potential exposure to significant levels of local air pollutants; potential exposure to seismic and flooding hazards; potential exposure to contamination from hazardous materials; potential exposure to traffic hazards; potential exposure to excessive noise levels; and potential exposure to wildfire. The risks from most of these potential hazards would be avoided or reduced to less-than-significant levels through compliance with existing laws, regulations, or requirements that are intended to protect human health and safety. In other instances, the potential project impacts to humans would not occur (e.g., wildfire), or would be avoided or reduced to less-than-significant levels through mitigation measures identified in this document. With the implementation of these measures to address potential impacts, it is expected that the Grape Solar Project would not have the potential to result in significant effects which will cause substantial adverse effects on human beings, either directly or indirectly.

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APPENDIX A

Air Quality and GHG Assessment

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February 2021

GRAPE SOLAR PROJECT AIR QUALITY ASSESSMENT

Kings County, California

February 16, 2021

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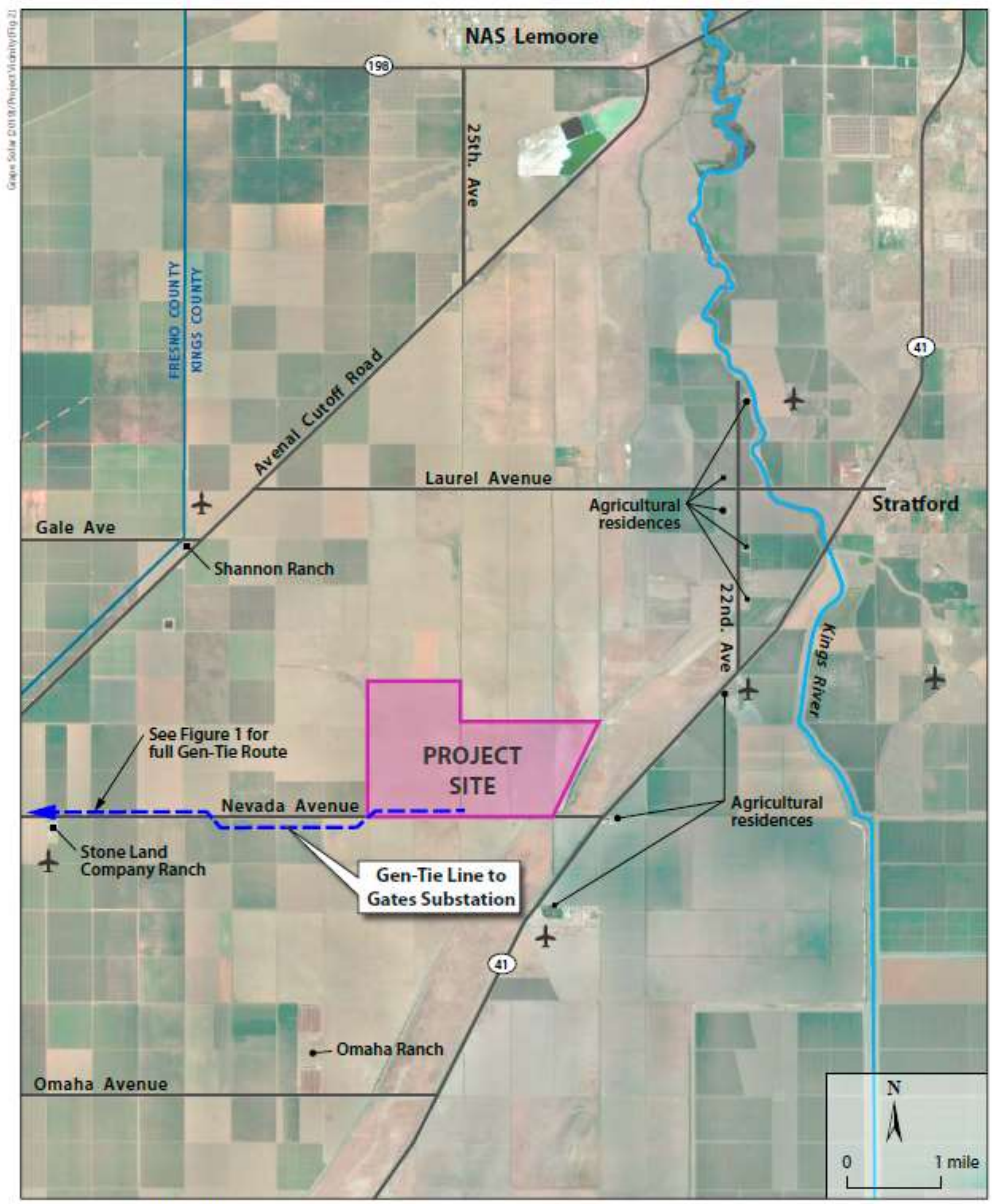
INTRODUCTION

This report assesses the air quality impacts associated with the Grape Solar Project proposed in Kings County, California. The Project will occupy an approximately 1,759-acre site generally located on the north side of Nevada Avenue, approximately one-half mile west of State Route 41 (SR 41), as seen in Figure 1.



Source: Google Earth, 2019

Figure 1. Grape Solar Project Location

The Grape Solar Project is planned to generate at total of 250 megawatt (MW) alternating current (AC) of electrical output from solar photovoltaic (PV) modules. The project is planned to be constructed over a 14-month period commencing in mid-2022, with completion scheduled for mid-2023.

The solar modules will be mounted on a series of horizontal single-axis trackers which will be oriented north-south and rotate the solar arrays in an east-west direction. The solar modules produce direct current (DC) power and the electricity travels to power conversion stations (PCS) via underground cables to be converted to AC power. The project will include a total of 100 PCSs with power rating of 2.5 MW each, which will step up the generated power to a collection voltage of 34.5-kilavolts (kV).

The Grape Solar Project will include an electrical substation, a battery storage facility, and an Operations and Maintenance (O&M) facility, all of which will be located together within a 10-acre area near the southern border of the project site, just northeast of the intersection of Nevada Avenue and the 25th Avenue alignment. The on-site substation will step up the generated power from 34.5-kV collection voltage to 230-kV for transmission.

The battery storage facility will include approximately 250 battery storage units (i.e., containers) plus 125 inverter/transformer sets or skids, which will be used to optimize power delivery to the grid, by storing excess generation during low demand periods, and supplying power to the grid when demand is high.

The power generated at the Grape Solar facility will be conveyed to a new 230-kV gen-tie line that will connect the project to the Point of Interconnection (POI) with the PG&E system at the Gates Substation. The new gen-tie line will follow Nevada Avenue for a distance of 6.2 miles to the Fresno County line just west of Avenal Cutoff Road. An additional 6.3 miles of gen-tie line will continue along Jayne Avenue in Fresno County to the Gates Substation. The Kings County portion of the Gen-Tie Line was approved by Kings County together with the Aquamarine Solar Project (Conditional Use Permit No. 17-04) located one mile north of the Grape Solar Project site. The Fresno County segment of the Gen-Tie Line was approved by a separate Conditional Use Permit from the County of Fresno.

The project's potential impacts on air quality during construction and operation are assessed in this report. Development projects of this type in the San Joaquin Valley are most likely to cause air quality impacts from emissions generated during construction and indirect emissions from vehicles used to transport site employees and for vehicles dedicated for onsite maintenance uses. The San Joaquin Valley Air Pollution Control District (SJVAPCD) has published the Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI) that was used to conduct this air quality analysis.[1] This report describes existing air quality conditions, construction period air quality impacts, operational air quality impacts (at both a local and regional scale), and identifies mitigation measures necessary to reduce or eliminate air quality impacts identified as significant.

[1] SJVAPCD. 2015. Guide for Assessing and Mitigating Air Quality Impacts. March.

SETTING

TOPOGRAPHIC CONSIDERATIONS

The project site is located in Kings and Fresno Counties in the south-western portion of the San Joaquin Valley Air Basin. The California Air Resources Board (CARB) defines the boundaries of the basin by the San Joaquin Valley within the Sierra Nevada Mountains to the east, the Coast Ranges in the west, and the Tehachapi mountains in the south. The valley is basically flat with a slight downward gradient to the northwest. The valley opens to the ocean at the Carquinez Strait where the San Joaquin-Sacramento Delta empties into San Francisco Bay. The San Joaquin Valley, thus, could be considered a “bowl” with the primary opening to the north. The surrounding topographic features restrict air movement through and out of the basin and, as a result, impede the dispersion of air pollutants from the basin. Wind flow is usually down the valley from the north, but the Tehachapi Mountains block or restrict the southward progression of airflow. The Sierra Nevada is a substantial barrier from the usual winds that have a general westerly flow. The topographical features result in weak airflow. The flow is further restricted vertically by inversion layers that are common in the San Joaquin Valley air basin throughout the year. An inversion layer is created when a mass of warm dry air sits over cooler air near the ground, preventing vertical dispersion of pollutants from the air mass below. During the summer, the San Joaquin Valley experiences daytime temperature inversions at elevations from 1,500 to 3,000 feet above the valley floor. Airflow is considerably restricted since mountain ranges surrounding the valley are generally above the inversion. These inversions lead to a buildup of ozone and ozone precursor pollutants. During the fall and winter months, strong surface-based inversions occur from 500 to 1,000 feet above the valley floor (SJVAPCD 1998). Wintertime inversions trap very stable air near the surface and lead primarily to a buildup of particulate matter air pollutants. Very light winds are also characteristic with these wintertime surface-based inversions.

AIR BASIN CHARACTERISTICS

The climate of the project area is characterized by hot dry summers and cool, mild winters. Clear days are common from spring through fall. Daytime temperatures in the summer often approach or exceed 100 degrees, with lows in the 60s. In the winter, daytime temperatures are usually in the 50s, with lows around 35 degrees. Radiation fog is common in the winter and may persist for days. Partly to mostly cloudy days are common in winter, as most precipitation received in the Valley falls from November through April.

Winds are predominantly up-valley (flowing from the north) in all seasons, but more so in the summer and spring months (CARB 1984). In this flow, winds are usually from the north end of the Valley and flow in a south-southeasterly direction, through Tehachapi Pass, into the Southeast Desert Air Basin. Annually, up-valley wind flow (i.e., northwest flow with marine air) is most common, occurring about 40 percent of the time. This type of flow is usually trapped below marine and subsidence inversions, restricting outflow through the Sierra Nevada and Tehachapi Mountains. The occurrence of this wind flow is almost 70 percent of the time in summer, but less than 20 percent of the time in winter. Winter and fall are characterized by mostly light and variable wind flow. Pacific storm systems do bring southerly flows to the valley during late fall and winter. Light and variable winds, less than 10 miles per hour (mph), are common in the colder months.

Superimposed on this seasonal regime is the diurnal wind cycle. In the Valley, this cycle takes the form of a combination of a modified sea breeze-land breeze and mountain-valley regimes. The sea breeze-land breeze regime typically has a modified sea breeze flowing into the Valley from the north during the late day and evening and then a land breeze flowing out of the Valley late at night and early in the morning. The mountain-valley regime has an upslope (mountain) flow during the day and a down slope (valley) flow at night. These effects create a complexity of regional wind flow and pollutant transport within the Valley.

The pollution potential of the San Joaquin Valley is very high. The San Joaquin Valley has one of the most severe air pollution problems in the State and the Country. Surrounding elevated terrain in conjunction with temperature inversions frequently restrict lateral and vertical dilution of pollutants. Abundant sunshine and warm temperatures in late spring, summer, and early fall are ideal conditions for the formation of ozone, where the Valley frequently experiences unhealthy air pollution days. Low wind speeds, combined with low inversion layers in the winter, create a climate conducive to high respirable particulate matter (PM_{10}) concentrations and elevated carbon monoxide (CO) levels.

REGULATORY SETTING

The Federal and California Clean Air Acts have established ambient air quality standards for different pollutants. National ambient air quality standards (NAAQS) were established by the Federal Clean Air Act of 1970 (amended in 1977 and 1990) for six "criteria" pollutants. These criteria pollutants now include carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), respirable particulate matter with a diameter less than 10 microns (PM_{10}), sulfur dioxide ($S0_2$), and lead (Pb). In 1997, The Environmental Protection Agency (EPA) added fine particulate matter ($PM_{2.5}$) as a criteria pollutant. The air pollutants for which standards have been established are considered the most prevalent air pollutants that are known to be hazardous to human health. California ambient air quality standards (CAAQS) include the NAAQS pollutants and also hydrogen sulfide, sulfates, vinyl chloride, and visibility reducing particles. These additional CAAQS pollutants tend to have unique sources and are not typically examined in environmental air quality assessments. In addition, lead concentrations have decreased dramatically since it was removed from motor vehicle fuels.

Federal Regulations

At the federal level, the United States Environmental Protection Agency (US EPA) administers and enforces air quality regulations. Federal air quality regulations were developed primarily from implementation of the Federal Clean Air Act. If an area does not meet NAAQS over a set period (three years), EPA designates it as a "nonattainment" area for that particular pollutant. EPA requires states that have areas that do not comply with the national standards to prepare and submit air quality plans showing how the standards would be met. If the states cannot show how the standards would be met, then they must show progress toward meeting the standards. These plans are referred to as the State Implementation Plan (SIP). Under severe cases, EPA may impose a federal plan to make progress in meeting the federal standards.

EPA also has programs for identifying and regulating hazardous air pollutants. The Clean Air Act requires EPA to set standards for these pollutants and sharply reduce emissions of controlled chemicals. Industries were classified as major sources if they emitted certain amounts of hazardous air pollutants. The US EPA also sets standards to control emissions of hazardous air pollutants through mobile source control programs. These include programs that reformulated gasoline, national low emissions vehicle standards, Tier 2 motor vehicle emission standards, gasoline sulfur control requirements, and heavy-duty engine standards.

The San Joaquin Valley Air Basin is subject to major air quality planning programs required by the federal Clean Air Act (CAA) (1977, last amended in 1990, 42 United States Code [USC] 7401 *et seq.*) to address ozone, particulate matter air pollution, and carbon monoxide. The CAA requires that regional planning and air pollution control agencies prepare a regional Air Quality Plan to outline the measures by which both stationary and mobile sources of pollutants can be controlled in order to achieve all standards within the deadlines specified in the Clean Air Act. These plans are submitted to the State, which after approval, submits them to US EPA as the SIP.

State Regulations

The California Clean Air Act of 1988, amended in 1992, outlines a program for areas in the State to attain the CAAQS by the earliest practical date. CARB is the state air pollution control agency and is a part of the California EPA. The California Clean Air Act sets more stringent air quality standards for all of the pollutants covered under national standards, and additionally regulates levels of vinyl chloride, hydrogen sulfide, sulfates, and visibility-reducing particulates. If an area does not meet CAAQS, CARB designates the area as a nonattainment area. The San Joaquin Valley Air Basin does not meet the CAAQS for ozone, PM_{10}, and $PM_{2.5}$. CARB requires regions that do not meet CAAQS for ozone to submit clean air plans that describe plans to attain the standard or show progress toward attainment.

In addition to the US EPA, CARB further regulates the amount of air pollutants that can be emitted by new motor vehicles sold in California. Motor vehicle emissions standards have always been more stringent than federal standards since they were first imposed in 1961. CARB has also developed Inspection and Maintenance (I/M) and "Smog Check" programs with the California Bureau of Automotive Repair. Inspection programs for trucks and buses have also been implemented. CARB also sets standards for motor vehicle fuels sold in California.

San Joaquin Valley

The San Joaquin Valley Air Pollution Control District (SJVAPCD) is made up of eight counties in California's Central Valley: San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings Tulare and the San Joaquin Valley portion of Kern. The primary role of the SJVAPCD is to develop plans and implement control measures in the San Joaquin Valley to control air pollution. These controls primarily affect stationary sources such as industry and power plants. Rules and regulations have been developed by SJVAPCD to control air pollution from a wide range of air pollution sources. In March 2007, an Indirect Source Review (ISR) rule was adopted that controls air pollution from new land developments. SJVAPCD also conducts public education and outreach efforts such as the Spare the Air, Wood Burning, and Smoking Vehicle voluntary programs.

Kings County 2035 General Plan. The Air Quality Element establishes goals, objectives, and policies to guide planning decisions and provides the platform for local action in addressing air quality and climate change issues.

Applicable goals, objectives, and policies presented in the General Plan are as follows:

C. Air Quality Management

AQ GOAL C1 Use Air Quality Assessment and Mitigation programs and resources of the SJVAPCD and other agencies to minimize air pollution, related public health effects, and potential climate change impacts within the County.

AQ OBJECTIVE C1.1 Accurately assess and mitigate potentially significant local and regional air quality and climate change impacts from proposed projects within the County.

The environmental assessment process required under the California Environmental Quality Act (CEQA) is by far the most important tool for local government to communicate with other agencies and the public on the air quality impacts of new development within a community. Strong and consistent application of CEQA requirements can make a significant difference in preventing or minimizing project level air quality impacts. In addition, the County can also offer its assistance to existing land uses to reduce their air pollution and greenhouse gas emissions.

AQ Policy C1.1.1: Assess and mitigate project air quality impacts using analysis methods and significance thresholds recommended by the SJVAPCD.

AQ Policy C1.1.2: Assess and mitigate project greenhouse gas/climate change impacts using analysis methods and significance thresholds as defined or recommended by the SJVAPCD, KCAG or California Air Resources Board (ARB) depending on the type of project involved.

AQ Policy C1.1.3: Ensure that air quality and climate change impacts identified during CEQA review are minimized and consistently and fairly mitigated at a minimum, to levels as required by CEQA.

AQ Policy C1.1.4 Identify and maintain an on-going inventory of the cumulative transportation, air quality, and climate change impacts of all general plan amendments approved during each year.

AQ Policy C1.1.5 Assess and reduce the air quality and potential climate change impacts of new development projects that may be insignificant by themselves but, taken together, may be cumulatively significant for the County as a whole.

AQ Policy C1.1.6 Encourage and support the development of innovative and effective mitigation measures and programs to reduce air quality and climate change impacts through proactive coordination with the SJVAPCD, project applicants, and other knowledgeable and interested parties.

AQ Policy C1.1.7 Initiate through the Community Development Agency discussions with the SJVAPCD to develop a program and identify mitigation projects that would permit the expenditure of SJVAPCD Rule 9510 – Indirect Source Review air quality mitigation fees generated in Kings County on air quality projects in Kings County to maximize local benefits to air quality and the economy.

AQ Policy C1.1.8 Actively work with project sponsors to maximize their participation in Voluntary Emission Reduction Agreements (VERA) with the SJVAPCD that fulfill the requirements of CEQA and Rule 9510 and provide emission reductions at least as large as those required by Rule 9510. The VERA process provides an opportunity for the County to identify local air emission reduction projects and expand the County's active participation in the project selection process.

E. Energy Efficiency and Conservation

AQ GOAL E1 Minimize air emissions and potential climate change impacts related to energy consumption in the County.

AQ OBJECTIVE E1.1 Increase the use of energy conservation features, renewable sources of energy and low-emission equipment in new and existing development projects within the County.

Natural gas burning appliances used for space heating, water heating, and cooking are a sizable source of NO_x and CO_2 emissions. Consumption of electricity also causes pollutant emissions from the operation of power plants fueled by fossil fuels. Reduction in local energy demand will also reduce overall energy demand, which decreases the expediency for new energy production plant construction. Local efforts to reduce energy consumption can save consumers money and improve air quality. Simple and cost-effective designs, technologies, and methods are available to achieve energy savings and reduce air pollutant emissions.

AQ Policy E1.1.1 Initiate and sustain ongoing efforts with local water and energy utilities and developers to establish and implement voluntary incentive based programs to encourage the use of energy efficient designs and equipment in new and existing development projects within the County.

AQ Policy E1.1.2 Initiate and sustain ongoing efforts with agriculture, the building industry, water and energy utilities and the SJVAPCD to promote enhanced energy conservation and sustainable building standards for new construction.

AQ Policy E1.1.3 Work with local water and energy utilities and the building industry to develop or revise County design standards relating to solar orientation of building occupancies, water use, landscaping, reduction in impervious surfaces, parking lot shading and such other measures oriented towards reducing energy demand.

AQ Policy E1.1.4 Actively promote the more efficient location of industries within the County which are labor intensive, utilize cogeneration or renewable sources of energy, support and enhance agricultural activities, and are consistent with other policies of the General Plan.

AQ Policy E1.1.5 County staff will proactively work with the Cooperative Agricultural Extension office, California Energy Commission, local water and energy utilities, the agricultural industry, and other potential partners to seek funding sources and implement programs which reduce water and energy use, reduce air emissions and reduce the creation of greenhouse gases.

F. Hazardous Emissions and Public Health

AQ GOAL F1 Minimize exposure of the public to hazardous air pollutant emissions, particulates and noxious odors from freeways, major arterial roadways, industrial, manufacturing, and processing facilities.

AQ OBJECTIVE F1.1 Locate adequate sites for industrial development and roadway projects away from existing and planned sensitive land uses which minimize or avoid potential health risks to people that might result from hazardous air pollutant emissions.

Decisions for locating industrial and residential development has the potential to create land use conflicts due to exposure to hazardous emissions. In addition, planning sensitive land uses in proximity to major transportation routes and facilities can also result in public health concerns. Providing appropriate locations and separation for incompatible land uses for all types of development can minimize conflicts and promote economic growth.

AQ Policy F1.1.1 Locate residential development projects and projects categorized as sensitive receptors an adequate distance from existing and potential sources of hazardous emissions such as major transportation corridors, industrial sites, and hazardous material locations in accordance with the provisions of ARB's Air Quality and Land Use Handbook.

AQ Policy F1.1.2 Locate new air pollution point sources such as, but not limited to industrial, manufacturing, and processing facilities an adequate distance from residential areas and other sensitive receptors in accordance with the provisions of ARB's Air Quality Land Use Handbook.

AQ OBJECTIVE F2.1 Reduce emissions of PM_{10}, $PM_{2.5}$ and other particulates from sources with local control potential or under the jurisdiction of the County.

Levels of PM_{10} (particulate matter less than 10 microns in diameter) no longer exceed federal health based standards. However, maintenance of the federal standard and achieving the state standard while accommodating growth will require continued effort. The San Joaquin Valley was recently reclassified as a maintenance area for PM_{10} under the federal criteria. Because of this classification, the SJVAPCD is required to take actions to ensure continued maintenance of the standard in the future. This is accomplished by the continued implementation of Best Available Control Measures (BACM) on all significant sources of emissions. Control efforts for sources under the jurisdiction of the County can significantly reduce these emissions. The SJVAB also exceeds the annual $PM_{2.5}$ (particulate matter less than 2.5 microns in diameter) standards. Some actions to reduce PM_{10} and ozone precursors will also reduce $PM_{2.5}$.

AQ Policy F2.1.1 Coordinate with the SJVAPCD to ensure that construction, grading, excavation and demolition activities within County's jurisdiction are regulated and controlled to reduce particulate emissions to the maximum extent feasible.

AQ Policy F2.1.2 Require all access roads, driveways, and parking areas serving new commercial and industrial development are constructed with materials that minimize particulate emissions and are appropriate to the scale and intensity of use.

AQ Policy F2.1.3 Develop a program to reduce PM_{10} emissions from County maintained roads to the maximum extent feasible.

G. Climate Change

AQ GOAL G1 Reduce Kings County's proportionate contribution of greenhouse gas emissions and the potential impact that may result on climate change from internal governmental operations and land use activities within its authority.

AQ OBJECTIVE G1.1 Identify and achieve greenhouse gas emission reduction targets consistent with the County's proportionate fair share as may be allocated by ARB and KCAG.

Global climate change is an emerging issue that requires all levels of government to take action to reduce emissions under their jurisdiction and influence.

AQ Policy G1.1.1 As recommended in ARB's Climate Change Adopted Scoping Plan (December 2008), the County establishes an initial goal of reducing greenhouse gas emissions from its internal governmental operations and land use activities within its authority to be consistent with ARB's adopted reduction targets for the year 2020. The County will also work with KCAG to ensure that it achieves its proportionate fair share reduction in greenhouse gas emissions as may be identified under the provisions of SB 375 (2008 Chapter 728) for any projects or activities requiring approval from KCAG.

AQ Policy G1.1.2 Progress in meeting the goals specified in AQ Policy G1.1.1 will be monitored and reported to the Board of Supervisors in the Annual Progress Report required by Government Code Section 65400(a)(2). Should the Board determine that sufficient progress is not being made to achieve the identified goals, or that proposed measures are ineffective or insufficient in meeting the goals, additional measures will be adopted as necessary.

AQ Policy G1.1.3 County staff should explore opportunities to utilize the net emission reductions identified through the confined animal feeding operation approval process to offset greenhouse gas emissions on a regional basis.

NATIONAL AND STATE AMBIENT AIR QUALITY STANDARDS

The CAA and CCAA promulgate, respectively, national and State ambient air quality standards. Air quality standards have been established by US EPA (i.e., NAAQS) and California (i.e., CAAQS) for specific air pollutants most pervasive in urban environments. The NAAQS and CAAQS are shown in Table 1. Ambient standards specify the concentration of pollutants to which the public may be exposed without adverse health effects. Individuals vary in their sensitivity to air pollutants, and standards are set to protect more pollution-sensitive populations (e.g., children and the elderly). National and State standards are reviewed and updated periodically based on new health studies. California ambient standards tend to be at least as protective as national ambient standards and are often more stringent. For planning purposes, regions like the San Joaquin Valley Air Basin are given an air quality status designation by the federal and State regulatory agencies. Areas with monitored pollutant concentrations that are lower than ambient air quality standards are designated "attainment" on a pollutant-by-pollutant basis. When monitored concentrations exceed ambient standards within an air basin, it is designated "nonattainment" for that pollutant. US EPA designates areas as "unclassified" when insufficient data are available to determine the attainment status. These areas are typically considered to be in attainment of the standard.

CRITERIA AIR POLLUTANTS AND THEIR HEALTH EFFECTS

The primary criteria air pollutants that would be emitted by the project include ozone (O_3) precursors (NO_x and ROG), carbon monoxide (CO), and suspended particulate matter (PM_{10} and $PM_{2.5}$). Other criteria pollutants, such as lead (Pb) and sulfur dioxide (SO_2), would not be substantially emitted by the Grape Solar project or traffic, and air quality standards for them are being met throughout the San Joaquin Valley Air Basin. A description of each pollutant is provided below, as described by SJVAPCD (2015) and the Bay Area Air Quality Management District.[2]

Ozone (O_3)

CARB describes the ozone and health impacts (CARB 2016a). While O_3 serves a beneficial purpose in the upper atmosphere (stratosphere) by reducing ultraviolet radiation potentially harmful to humans, when it reaches elevated concentrations in the lower atmosphere (troposphere) it can be harmful to the human respiratory system and to sensitive species of plants. Ozone concentrations build to peak levels during periods of light winds, bright sunshine, and high temperatures. Short-term O_3 exposure can reduce lung function in children, make persons susceptible to respiratory infection, and produce symptoms that cause people to seek medical treatment for respiratory distress. Long-term exposure can impair lung defense mechanisms and lead to emphysema and chronic bronchitis. A healthy person exposed to high concentrations may become nauseated or dizzy, may develop headache or cough, or may experience a burning sensation in the chest.

Ozone is formed in the atmosphere by a complex series of photochemical reactions that involve "ozone precursors" that consist of two families of pollutants: oxides of nitrogen (NO_x) and reactive organic gases (ROG). NO_x and ROG are emitted from a variety of stationary and mobile sources. While NO_2, an oxide of nitrogen, is another criteria pollutant itself, ROGs are not in that category, but are included in this discussion as O_3 precursors. In 2007, CARB adopted an 8-hour health-based standard for O_3 of 0.070 parts per million (ppm). The U.S. EPA revised the 8-hour NAAQS for O_3 from 0.080 ppm in 2008 and reduced it again in 2015 to 0.070 ppm[3] (CARB 2005, 2012, US EPA 2018).

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[2] Bay Area Air Quality Management District (BAAQMD). 2011. *BAAQMD CEQA Air Quality Guidelines*. May (updated May 2017). http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en

[3] U.S. EPA. 2017. *2008 National Ambient Air Quality Standards (NAAQS) for Ozone*. See https://www.epa.gov/ozone-pollution/2008-national-ambient-air-quality-standards-naaqs-ozone. Accessed 06/19/18.

TABLE 1 Ambient Air Quality Standards[4]

Pollutant	Averaging Time	California Standards Concentration	National Standards Concentration
Ozone	1-hour	0.09 ppm (180 μg/m^3)	—
	8-hour	0.070 ppm (137 μg/m^3)	0.070 ppm (137 μg/m^3) (3-year average of annual 4^{th} highest daily maxima)
Carbon Monoxide	8-hour	9.0 ppm (10,000 μg/m^3)	9 ppm (10,000 μg/m^3)
	1-hour	20 ppm (23,000 μg/m^3)	35 ppm (40,000 μg/m^3)
Nitrogen dioxide	Annual Average	0.030 ppm (57 μg/m^3)	0.053 ppm (100 μg/m^3)
	1-hour	0.18 ppm (339 μg/m^3)	0.100 ppm (188 μg/m^3) (3-year average of annual 98^{th} percentile daily maxima)
Sulfur dioxide			
	24-hour	0.04 ppm (105 μg/m^3)	—
	3-hour	—	0.5 ppm (1,300 μg/m^3)
	1-hour	0.25 ppm (655 μg/m^3)	0.075 ppm (196 μg/m^3) (3-year average of annual 99^{th} percentile daily maxima)
Respirable particulate matter (10 micron)	24-hour	50 μg/m^3	150 μg/m^3
	Annual Arithmetic Mean	20 μg/m^3	—
Fine particulate matter (2.5 micron)	Annual Arithmetic Mean	12 μg/m^3	12.0 μg/m^3 (3-year average)
	24-hour	—	35 μg/m^3 (3-year average of annual 98^{th} percentile daily concentrations)
Sulfates	24-hour	25 μg/m^3	—
Lead	30-day	1.5 μg/m^3	—
	3 Month Rolling Average	—	0.15 μg/m^3

Source: CARB website, 12/1/16.
SO_2 Federal 24 hour and annual standards are not applicable in the SJVAPCD.
μg/m^3 = micrograms per cubic meter
ppm = parts per million

Carbon Monoxide (CO)

CARB describes carbon monoxide and the health effects (CARB 2016b). Carbon monoxide or CO is a colorless, odorless, poisonous gas. Carbon monoxide's health effects are related to its affinity for hemoglobin in the blood. Exposure to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause dizziness and fatigue, and causes reduced lung capacity, impaired mental abilities and central nervous system function, and induces angina in persons with serious heart disease. Primary sources of CO in ambient air are exhaust emissions from on-road

[4] Source: California Air Resources Board (http://www.arb.ca.gov)

vehicles, such as passenger cars and light-duty trucks, and residential wood burning. The monitored CO levels in the Valley during the last 10 years have been well below ambient air quality standards.

Nitrogen Dioxide (NO_2)

As described by CARB (2016c), the major health effect from exposure to high levels of NO_2 is the risk of acute and chronic respiratory disease. Nitrogen dioxide is a combustion by-product, but it can also form in the atmosphere by chemical reaction. Nitrogen dioxide is a reddish-brown colored gas often observed during the same conditions that produce high levels of O_3 and can affect regional visibility. Nitrogen dioxide is one compound in a group of compounds consisting of oxides of nitrogen (NO_x). As described above, NO_x is an O_3 precursor compound. Monitored levels of NO_2 in the Valley are below ambient air quality standards.

Particulate Matter (PM)

CARB describes unhealthy particulate matter and the health effects (CARB 2016d). Respirable particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$) consist of particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively. PM_{10} and $PM_{2.5}$ represent fractions of particulate matter that can be inhaled and cause adverse health effects. PM_{10} and $PM_{2.5}$ are a health concern, particularly at levels above the Federal and State ambient air quality standards. $PM_{2.5}$ (including diesel exhaust particles) is thought to have greater effects on health because minute particles are able to penetrate to the deepest parts of the lungs. Scientific studies have suggested links between fine particulate matter and numerous health problems including asthma, bronchitis, acute and chronic respiratory symptoms such as shortness of breath and painful breathing. Children are more susceptible to the health risks of $PM_{2.5}$ because their immune and respiratory systems are still developing. These fine particulates have been demonstrated to decrease lung function in children. Certain components of PM are linked to higher rates of lung cancer. Very small particles of certain substances (e.g., sulfates and nitrates) can also directly cause lung damage or can contain absorbed gases (e.g., chlorides or ammonium) that may be injurious to health.

Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, fuel combustion, and atmospheric photochemical reactions. Some sources of particulate matter, such as mining and demolition and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect. In addition to health effects, particulates also can damage materials and reduce visibility. Dust comprised of large particles (diameter greater than 10 microns) settles out rapidly and is more easily filtered by human breathing passages. This type of dust is considered more of a soiling nuisance rather than a health hazard.

The current State PM_{10} standard, approved in 2002, is 20 micrograms per cubic meter (µg/m^3) for an annual average. The 24-hour average standard is 50 µg/m^3. $PM_{2.5}$ standards were first promulgated by the U.S. EPA in 1997 and were revised in 2006 to lower the 24-hour $PM_{2.5}$ standard to 35 µg/m^3 for 24-hour exposures (Federal Register, Vol. 71, No. 10, January 17, 2006). That same action by U.S. EPA also revoked the annual PM_{10} standard due to lack of scientific evidence correlating long-term exposures of ambient PM_{10} with health effects. CARB has only adopted an annual average $PM_{2.5}$ standard, which is set at 12 µg/m^3. This is equal to the NAAQS of 12 µg/m^3 (CARB 2016f).

TOXIC AIR CONTAMINANTS

Besides the "criteria" air pollutants, there is another group of substances found in ambient air referred to as Hazardous Air Pollutants (HAPs) under the CAA and Toxic Air Contaminants (TACs) under the CCAA. These contaminants tend to be localized and are found in relatively low concentrations in ambient air. However, they can result in adverse chronic health effects if exposure to low concentrations occurs for long periods. They are regulated at the local, state, and federal level.

HAPs are the air contaminants identified by U.S. EPA as known or suspected to cause cancer, serious illness, birth defects, or death. Many of these contaminants originate from human activities, such as fuel combustion and solvent use. Mobile source air toxics (MSATs) are a subset of the 188 HAPS. Of the 21 HAPs identified by U.S. EPA as MSATs, a priority list of six priority HAPs were identified that include: diesel exhaust, benzene, formaldehyde, acetaldehyde, acrolein, and 1,3-butadiene. The Federal Highway Administration (FHWA 2012) reports that while vehicle miles traveled (VMT) in the United States is expected to increase by 64 percent over the period 2000 to 2020, emissions of MSATs are anticipated to decrease substantially as a result of efforts to control mobile source emissions (by 57 percent to 67 percent depending on the contaminant).

California developed a program under the Toxic Air Contaminant Identification and Control Act (Assembly Bill [AB] 1807, Tanner 1983), also known as the Tanner Toxics Act, to identify, characterize and control TACs. Subsequently, AB 2728 (Tanner, 1992) incorporated all 188 HAPs into the AB 1807 process. TACs include all HAPs plus other containments identified by CARB. These are a broad class of compounds known to cause morbidity or mortality (cancer risk). TACs are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion, and commercial operations (e.g., dry cleaners). TACs are typically found in low concentrations, even near their source (e.g., diesel particulate matter (DPM) near a freeway). Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, state, and federal level.

The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, 1987, Connelly), described by CARB (2016e), was enacted in 1987, and requires stationary sources to report the types and quantities of certain substances routinely released into the air. The goals of the Air Toxics "Hot Spots" Act are to collect emission data, to identify facilities having localized impacts, to ascertain health risks, to notify nearby residents of significant risks, and to reduce those significant risks to acceptable levels.

Particulate matter from diesel exhaust is the predominant TAC in urban air and is estimated to represent about 70 percent of the cancer risk from TACs, based on the statewide average reported by CARB (2012). According to CARB, diesel exhaust is a complex mixture of gases, vapors and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by CARB, and are listed as carcinogens either under State Proposition 65 or under the Federal Hazardous Air Pollutants programs.

CARB (2012) reports that recent air pollution studies have shown an association that diesel exhaust and other cancer-causing TACs emitted from vehicles are responsible for much of the overall cancer risk from TACs in California. Particulate matter emitted from diesel-fueled engines (DPM) was found to comprise much of that risk. In 1998, CARB formally identified DPM as a TAC (CARB 2012). DPM is of particular concern since it can be distributed over large regions, thus leading to widespread public exposure. The particles emitted by diesel engines are coated with chemicals, many of which have been identified by U.S. EPA as HAPs, and by CARB as TACs. The vast majority of diesel exhaust particles (over 90 percent) consist of $PM_{2.5}$, which are the particles that can be inhaled deep into the lung (CARB 2012). Like other particles of this size, a portion will eventually become trapped within the lung possibly leading to adverse health effects. While the gaseous portion of diesel exhaust also contains TACs, CARB's 1998 action was specific to DPM, which accounts for much of the cancer-causing potential from diesel exhaust. California has adopted a comprehensive diesel risk reduction program to reduce DPM emissions 85 percent by 2020 (CARB 2000). The EPA and CARB adopted low sulfur diesel fuel standards in 2006 that reduce DPM substantially.

Smoke from residential wood combustion can be a source of TACs. Wood smoke is typically emitted during winter when dispersion conditions are poor. Localized high TAC concentrations can result when cold stagnant air traps smoke near the ground and, with no wind the pollution can persist for many hours, especially in sheltered valleys during winter. Wood smoke also contains a significant amount of PM_{10} and $PM_{2.5}$. Wood smoke is an irritant and is implicated in worsening asthma and other chronic lung problems.

EXISTING AIR QUALITY

As previously discussed, the San Joaquin Valley experiences poor air quality conditions, due primarily to elevated levels of ozone and particulate matter (SJVAPCD 2015a). CARB, in cooperation with SJVAPCD, monitors air quality throughout the San Joaquin Valley Air Basin. Monitoring data presented in Table 2 was derived for each pollutant based upon the closest monitoring station to the project site.

Ozone

In California, ozone concentrations are generally lower near the coast regions than inland regions. The inland regions, such as the San Joaquin Valley, typically experience some of the higher ozone concentrations. This is because of the greater frequency of hot days (that is, higher temperatures) and stagnant air conditions (that is, very calm atmospheric conditions with very gentle winds) that are conducive to ozone formation. Many areas of the Valley lie downwind of urban areas that are sources of ozone precursor pollutants. While Kings County is fairly rural, exceedances of the ozone standard occurred on 29 to 49 days per year, based on the last 3 years of available monitoring data.

Carbon Monoxide

State and federal standards for carbon monoxide are met throughout California as a result of cleaner vehicles and fuels that were reformulated in the 1990s. For CO, the 2012 monitored value of 2.2 ppm for an 8-hour average was used as the air basin maximum level (CARB 2016f). Because CO levels are so low in the air basin, monitoring was discontinued after 2012.

TABLE 2 Summary of Criteria Air Pollution Monitoring Data for Kings County

Pollutant	Standard	Monitored Values[(1)] and Exceedance Days		
		2016	**2017**	**2018**
Ozone (ppm)	State 1-Hour	**0.097 / 2**	**0.106 / 7**	**0.108 / 1**
Ozone (ppm)	State 8-Hour	**0.088 / 49**	**0.094 / 38**	**0.082 / 29**
Ozone (ppm)	Federal 8-Hour	**0.088 / 49**	**0.094 / 38**	**0.082 /29**
PM_{10} (ug/m^3)	State 24-Hour	111/ 20	149/ 20	181/ 19
PM_{10} (ug/m^3)	Federal 24-Hour	152/ 0	**298/ 2[(2)]**	**174/ 6[(2)]**
PM_{10} (ug/m^3)	State Annual	**44**	**47**	**48**
$PM_{2.5}$ (ug/m^3)	Federal 24-Hour	**59.7/ 25**	**113.4 / 17[(2)]**	**107.8 / 17[(2)]**
$PM_{2.5}$ (ug/m^3)	State Annual	**15.6**	**16.8**	**17**
$PM_{2.5}$ (ug/m^3)	Federal Annual	**15.5**	**17.1**	**17.7**
Carbon Monoxide (ppm)	State/Fed.8-Hour	NA / --[(3)]	NA / --[(3)]	NA / --[(3)]
Nitrogen Dioxide (ppm)	State 1-Hour	0.052 / 0	0.056 / 0	0.056 / 0
Nitrogen Dioxide (ppm)	Federal 1-Hour	0.052 / 0	0.057 / 0	0.056 / 0
Nitrogen Dioxide (ppm)	State Annual	0.009	0.008	0.008

Note: (1) Monitored values are the high values considering the form of the applicable standard,
(2) affected by October 2017 and 2018 firestorms, and
(3) NA = not available in summaries, but last measured levels in 2012 were 2 ppm.
Source: CARB ADAM Data at http://www.arb.ca.gov/adam/index.html, Accessed 01/22/2020

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

Most areas of California have either 24-hour or annual PM_{10} concentrations that exceed the State standards. Most urban areas exceed the State annual standard and the 2006 24-hour federal standard. In the San Joaquin Valley (S.J. Valley or Valley), there is a strong seasonal variation in PM, with higher PM_{10} and $PM_{2.5}$ concentrations occurring in the fall and winter months. These higher concentrations are caused by increased activity for some emission sources and meteorological conditions that are conducive to the build-up of particulate matter. Industry and motor vehicles consistently emit particulate matter. Seasonal sources of particulate matter in San Joaquin Valley include wildfires, agricultural activities, windblown dust, and residential wood burning. In California, area sources, which primarily consist of fugitive dust, account for the majority of directly emitted particulate matter. This includes dust from paved and unpaved roads. The ARB estimates that 85 percent of directly emitted PM_{10} (and 66 percent of directly emitted $PM_{2.5}$) is from area sources (SJVAPCD 2016). During the winter, the $PM_{2.5}$ size fraction makes up much of the total particulate matter concentrations. The major contributor to high levels of ambient $PM_{2.5}$ is the secondary formation of particulate matter caused by the reaction of NO_x and ammonium to form ammonium nitrate. ARB estimates that the secondary portion of $PM_{2.5}$ makes up about 50 percent of the annual concentrations in the Valley (SJVAPCD 2016). The S.J. Valley also records high PM_{10} and $PM_{2.5}$ levels during the fall. During this season, both the coarse fraction (from dust) and the $PM_{2.5}$ fraction result in elevated $PM_{2.5}$ and PM_{10} concentrations. Measured $PM_{2.5}$ levels exceeded federal standards on 25 to 33 days per year. Measured PM_{10} levels exceeded State standards on 19 to 20 days. Sampling occurs every sixth day so CARB estimated there were 114 to 122 days per year that PM_{10} levels exceeded the standard).

Other Pollutants

Current and past air monitoring data indicate that the San Joaquin Valley meets ambient air quality standards for NO_2, SO_2, and lead. Monitoring of lead, sulphates, hydrogen sulfide and vinyl chloride is not routinely conducted by CARB in the air basin (CARB 2018).

Air Quality Trends

Air quality in the Valley has improved significantly despite a natural low capacity for pollution, created by unique geography, topography, and meteorology. Emissions have been reduced at a rate similar or better than other areas in California. Since 1990, emissions of ozone precursors (i.e., NO_x and ROG) reduced by 80 percent (CARB 2016g), resulting in much fewer days where ozone standards have been exceeded. Direct emissions of PM_{10} and $PM_{2.5}$ have been reduced by 10 to 13 percent (CARB 2013). As a result, the San Joaquin Valley is the first air basin that was previously classified as “serious nonattainment” under the NAAQS to come into attainment of the PM_{10} standards.

ATTAINMENT STATUS

Areas that do not violate ambient air quality standards are considered to have attained the standard. Violations of ambient air quality standards are based on air pollutant monitoring data and are judged for each air pollutant. The San Joaquin Valley as a whole does not meet State or federal ambient air quality standards for ground level O_3 and State standards for PM_{10} and $PM_{2.5}$. The attainment status for the Valley with respect to various pollutants of concern is described in Table 3.

Under the CAA, the U.S. EPA has classified the Air Basin as *extreme nonattainment* for the 8-hour O_3 standard. As mentioned earlier, the Air Basin has attained the NAAQS for PM_{10}. The Air Basin is designated *nonattainment* for the older 1997 $PM_{2.5}$ NAAQS. U.S. EPA recently designated the Air Basin as nonattainment for the newer 2006 24-hour $PM_{2.5}$ standard. The U.S. EPA classifies the Air Basin as *attainment* or *unclassified* for all other air pollutants, which include CO and NO_2.

At the state level, the Air Basin is considered *severe nonattainment* for ground level O_3 and *nonattainment* for PM_{10} and $PM_{2.5}$. In general, California ambient air quality standards are more stringent than the national ambient air quality standards. The Air Basin is required to adopt plans on a triennial basis that show progress towards meeting the State O_3 standard. The Air Basin is considered *attainment* or *unclassified* for all other pollutants.

TABLE 3 Project Area Attainment Status

Pollutant	Federal Status	State Status
Ozone (O_3) – 1-Hour Standard	No Designation	Severe Nonattainment
Ozone (O_3) – 8-Hour Standard	Extreme Nonattainment	Nonattainment
Respirable Particulate Matter (PM_{10})	Attainment-Maintenance	Nonattainment
Fine Particulate Matter ($PM_{2.5}$)	Nonattainment	Nonattainment
Carbon Monoxide (CO)	Attainment	Attainment
Nitrogen Dioxide (NO_2)	Attainment	Attainment
Sulfur Dioxide (SO_2)	Attainment	Attainment
Sulfates and Lead	No Designation	Attainment
Hydrogen Sulfide	No Designation	Unclassified
Visibility Reducing Particles	No Designation	Unclassified
Vinyl Chloride	No Designation	Attainment

REGIONAL AIR QUALITY PLANS

In response to not meeting the NAAQS, the region is required to submit attainment plans to US EPA through the State, which are referred to as the SIP. These plans are provided on SJVAPCD's website at

CARB submitted the 2004 Extreme Ozone Attainment Demonstration Plan to EPA in 2004, which addressed the old 1-hour NAAQS. The region's 2007 Ozone Plan, addressing the 8-hour ozone NAAQS, was submitted to US EPA and approved in March 2012. That plan predicts attainment of the standard throughout 90 percent of the district by 2020 and the entire district by 2024. To accomplish these goals, that plan would reduce NO_x emissions further by 75 percent and ROG emissions by 25 percent. A wide variety of control measures are included in these plans, such as reducing or offsetting emissions from construction and traffic associated with land use developments. The air basin was since designated as an extreme ozone nonattainment area for the more stringent 2008 8-hour ozone NAAQS. The 2016 Plan for the 2008 8-Hour Ozone Standard was adopted by SJVAPCD on June 16, 2016. Addressing the 2008 8-hour ozone standard will pose a tremendous challenge for the Valley, as NOx emissions will be reduced by 60 percent. will bring the San Joaquin Valley into attainment of EPA's 2008 8-hour ozone standard as expeditiously as practicable, no later than December 31, 2031. SJVAPCD's 2016 Ozone Plan received EPA's final approval or conditional approval of all portions of the plan in 2019. EPA found that sufficient quantified emissions reductions are identified in the plan without including unquantified emissions reductions such as those related to the “further study” of Rule 4694 that controls emissions from winery activities (fermentation and storage of wines).

On April 25, 2008, US EPA proposed to approve the 2007 PM_{10} Maintenance Plan and Request for Re-designation. The region now meets the NAAQS for PM_{10}. The SJVAPCD adopted the 2008 $PM_{2.5}$ Plan on April 30, 2008. US EPA has designated the basin as Attainment.

The SJVAPCD adopted the 2018 Plan for the 1997, 2006 and 2012 $PM_{2.5}$ Plan Standards on November 15, 2018. This plan was approved by CARB on January 24, 2019. This plan demonstrates attainment of the federal $PM_{2.5}$ standards as expeditiously as practicable. The plan uses control measures to reduce NO_x, which also leads to fine particulate formation in the atmosphere. The plan incorporates measures to reduce direct emissions of $PM_{2.5}$, including a strengthening of regulations for various SJVAB industries and the general public through new rules and amendments. The plan increases controls on residential wood-burning activities.

Both the ozone and $PM_{2.5}$ plans include all measures (i.e., federal, state and local) that would be implemented through rule making or program funding to reduce air pollutant emissions. Transportation Control Measures (TCMs) are part of these plans. The plans described above addressing ozone also meet the state planning requirements.

SJVAPCD RULES AND REGULATIONS

The SJVAPCD has adopted rules and regulations that apply to land use projects, such as the proposed project. These are described below.

SJVAPCD Indirect Source Review Rule

In 2005, the SJVAPCD adopted Rule 9510 Indirect Source Review (ISR or Rule 9510) to reduce NO_x and PM_{10} emissions from new land use development projects. The rule, which became effective March 1, 2006, is the result of state requirements outlined in the region’s portion of the State Implementation Plan (SIP). Rule 9510 was amended in December 2017 (and became effective March 21, 2018) to ensure that all large development projects are subject to the rule (SJVAPCD 2017). The SJVAPCD’s SIP commitments are contained in the 2004 Extreme Ozone Attainment Demonstration Plan and the 2003 PM_{10} Plan. These plans identified the need to reduce PM_{10} and NO_x substantially in order to attain and maintain the ambient air-pollution standards on schedule.

New projects that would generate substantial air pollutant emissions are subject to this rule. The rule requires projects to mitigate both construction and operational period emissions by applying the SJVAPCD-approved mitigation measures and paying fees to support programs that reduce emissions. The rule requires mitigated exhaust emissions during construction based on the following levels:

- 20 percent reduction from unmitigated baseline in total NO_x exhaust emissions
- 45 percent reduction from unmitigated baseline in total PM_{10} exhaust emissions

For operational emissions, Rule 9510 requires the following reductions:

- 33.3 percent of the total operational NO_x emissions from unmitigated baseline
- 50 percent of the total operational PM_{10} exhaust emissions from unmitigated baseline

Fees apply to the unmitigated portion of the emissions and are based on estimated costs to reduce the emissions from other sources plus estimated costs to cover administration of the program. In accordance with ISR, the project applicant will submit an application for approval of an Air Impact Assessment (AIA) to the SJVAPCD.

Regulation VIII – Fugitive PM_{10}

SJVAPCD controls fugitive PM_{10} through Regulation VIII (Fugitive PM_{10} Prohibitions). The purpose of this regulation is to reduce ambient concentrations of PM_{10} by requiring actions to prevent, reduce or mitigate anthropogenic (human caused) fugitive dust emissions. This applies to activities such as construction, bulk materials, open areas, paved and unpaved roads, material transport, and agricultural areas. Sources regulated are required to provide dust control plans that meet the regulation requirements. Fees are collected by SJVAPCD to cover costs for reviewing plans and conducting field inspections.

Other SJVAPCD Rules

Other SJVAPCD Rules and Regulations that may be applicable to the project include, but are not limited to:

- Rule 4101 (Visible Emissions): The purpose of this rule is to prohibit the emissions of visible air contaminants to the atmosphere. The provisions of this rule apply to any source operation which emits or may emit air contaminants.
- Rule 4102 (Nuisance): The purpose of this rule is to protect the health and safety of the public, and applies to any source operation that emits or may emit air contaminants or other materials.
- Rule 4601 (Architectural Coatings): The purpose of this rule is to limit Volatile Organic Compounds (VOC) emissions from architectural coatings. Emissions are reduced by limits on VOC content and providing requirements on coatings storage, cleanup, and labeling.
- Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations): The purpose of this rule is to limit VOC emissions from asphalt paving and maintenance operations. Paving operations will be subject to Rule 4641.

The Air District is anticipated to provide a determination of applicable rules/regulations to the project when specific building, grading, etc. plans are provided to the Air District prior to initiation of construction- and operation-related activities that fall within the purview of the Air District’s regulatory authority.

SENSITIVE RECEPTORS

"Sensitive receptors" are defined as facilities where sensitive population groups, such as children, the elderly, the acutely ill, and the chronically ill, are likely to be located. Land uses that include sensitive receptors are residences, schools, playgrounds, childcare centers, retirement homes, convalescent homes, hospitals, and medical clinics.

The nearest residences consist of dispersed rural residences located along SR 41, east and south of the project site. The closest receptors are 3,000 feet east, 5,200 feet south, and 8,000 feet northeast, with other residences 2.5 miles or further away.

IMPACT ANALYSIS

STANDARDS OF SIGNIFICANCE

Appendix G, of the California Environmental Quality Act (CEQA) Guidelines (Environmental Checklist) contains a list of project effects that may be considered significant. The project would result in a significant impact if it would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard;
- Expose sensitive receptors to substantial pollutant concentrations;
- Result in other emissions (such as those leading to odors) affecting a substantial number of people;
- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant effect on the environment; or
- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

The SJVAPCD has developed the Guide for Assessing and Mitigating Air Quality Impacts (SJVAPCD 2015), also known as the GAMAQI. The following thresholds of significance, obtained from the SJVAPCD's GAMAQI, are used to determine whether a proposed project would result in a significant air quality impact:

1) Construction Emissions of PM. Construction projects are required to comply with Regulation VIII as listed in the SJVAPCD; however, the size of the project and the proximity to sensitive receptors may warrant additional measures.

2) Criteria Air Pollutant Emissions. SJVAPCD current adopted thresholds of significance for criteria pollutant emissions and their application is presented in Table 4. These thresholds address both construction and operational emissions. Note that the District treats permitted equipment and activities separately. The project is not considered a source of SOx emissions and would have relatively low CO emissions.

3) Ambient Air Quality. Emissions that are predicted to cause or contribute to a violation of an ambient air quality would be considered a significant impact. SJVAPCD recommends that dispersion modeling be conducted for construction or operation when on-site emissions exceed 100 pounds per day after implementation of all mitigation measures.

4) Local CO Concentrations. Traffic emissions associated with the proposed project would be considered significant if the project contributes to CO concentrations at receptor locations in excess of the ambient air quality standards.

5) Toxic Air Contaminants or Hazardous Air Pollutants. Exposure to HAPs or TACs would be considered significant if the probability of contracting cancer for the Maximally Exposed Individual would exceed 20 in 1 million or would result in a Hazard Index greater than 1 for non-cancer health effects.

6) Odors. Odor impacts associated with the proposed project would be considered significant if the project has the potential to frequently expose members of the public to objectionable odors through development of a new odor source or placement of receptors near an existing odor source.

7) Greenhouse Gases (GHGs). In SJVAPCD's *Guidance for Valley Land-Use Agencies in Addressing GHG Emissions Impacts for New Projects Under CEQA*, the District establishes a requirement that land use development projects demonstrate a 29 percent reduction in GHG emissions from Business-As-Usual (BAU).

8) With respect to cumulative air quality impacts, the GAMAQI provides that any proposed project that would individually have a significant air quality impact (i.e., exceed significance thresholds for criteria pollutants ROG, NOx, or PM_{10}) would also be considered to have a significant cumulative impact. In cases where project emissions are all below the applicable significance thresholds, a project may still contribute to a significant cumulative impact if there are other projects nearby whose emissions would combine with project emissions to result in an exceedance of one or more significance thresholds for criteria pollutants.

TABLE 4 SJVAPCD Air Quality Thresholds of Significance – Criteria Pollutant Emission Levels in Tons Per Year

Pollutant/Precursor	Construction Emissions	Operational Emissions: Permitted Equipment and Activities	Operational Emissions: Non-Permitted Equipment and Activities
Carbon Monoxide (CO)	100	100	100
Nitrogen Oxides (NOx)	10	10	10
Reactive Organic Gases	10	10	10
Sulfur Dioxide (SOx)	27	27	27
Particulate Matter – PM_{10}	15	15	15
Particulate Matter – $PM_{2.5}$	15	15	15

Source: San Joaquin Valley Air Pollution Control District, GAMAQI, Page 80, Table 2 or website at http://www.valleyair.org/transportation/0714-GAMAQI-Criteria-Pollutant-Thresholds-of-Significance.pdf.

AIR QUALITY IMPACTS

Project-related air quality impacts fall into two categories: short-term impacts due to construction, and long-term impacts due to the proposed project operation. During construction, the proposed project would affect local particulate concentrations primarily due to fugitive dust sources and contribute to ozone and $PM_{10}/PM_{2.5}$ levels due to exhaust emissions. Over the long-term, the proposed project would result in an increase in emissions of ozone precursors such as ROG and NO_x, primarily due to increased motor vehicle trips (employee trips, site deliveries, and onsite maintenance activities).

Impact 1: Construction Dust. Construction activity involves a high potential for the emission of fugitive particulate matter emissions that would affect local air quality. This would be *less-than-significant* with implementation of Regulation VIII.

Construction activities would temporarily affect local air quality, causing a temporary increase in particulate dust and other pollutants. Dust emission during periods of construction would increase particulate concentrations at neighboring properties. This impact is potentially significant, but normally it can be mitigated.

The Project construction activities are anticipated to take place over an approximate 14-month period from mid- 2022 to mid- 2023. Site preparation and disturbance (e.g., vehicle travel on exposed areas) would likely result in the greatest emissions of dust and $PM_{10}/PM_{2.5}$. Windy conditions during construction could cause substantial emissions of $PM_{10}/PM_{2.5}$.

There are no sensitive receptors near the site, as the closest residence is about 3,000 feet away. The SJVAPCD's GAMAQI, emphasizes implementation of effective and comprehensive control measures. SJVAPCD adopted a set of PM_{10} fugitive dust rules collectively called Regulation VIII. This regulation essentially prohibits the emissions of visible dust (limited to 20-percent opacity) and requires that disturbed areas or soils be stabilized. Compliance with Regulation VIII during the construction phase of the proposed project would be required. Prior to construction of each project phase, the applicant would be required to submit a dust control plan that meets the regulation requirements. These plans are reviewed by SJVAPCD and construction cannot begin until District approval is obtained. The provisions of Regulation VIII and its constituent rules pertaining to construction activities generally require:

- Effective dust suppression (e.g., watering) for land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill and demolition activities.
- Effective stabilization of all disturbed areas of a construction site, including storage piles, not used for seven or more days.
- Control of fugitive dust from on-site unpaved roads and off-site unpaved access roads.
- Removal of accumulations of mud or dirt at the end of the workday or once every 24 hours from public paved roads, shoulders and access ways adjacent to the site.
- Cease outdoor construction activities that disturb soils during periods with high winds.
- Record keeping for each day dust control measures are implemented.
- Limit traffic speeds on unpaved roads to 15 mph.

- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Landscape or replant vegetation in disturbed areas as quickly as possible.
- Prevent the tracking of dirt on public roadways. Limit access to the construction sites, so tracking of mud or dirt on to public roadways can be prevented. If necessary, use wheel washers for all exiting trucks, or wash off the tires or tracks of all trucks and equipment leaving the site.
- Suspend grading activity when winds (instantaneous gusts) exceed 25 mph or dust clouds cannot be prevented from extending beyond the site.

Anyone who prepares or implements a Dust Control Plan must attend a training course conducted by the District. Construction sites are subject to SJVAPCD inspections under this regulation. Compliance with Regulation VIII, including the effective implementation of a Dust Control Plan that has been reviewed and approved by the SJVAPCD, would reduce dust and PM_{10} emissions to a *less-than-significant* level.

Impact 2: Construction Exhaust Emissions. Equipment and vehicle trips associated with construction would emit ozone precursor and particulate matter air pollutants on a temporary basis. Construction emissions would be above the GAMAQI significance threshold. This would be a *significant* impact.

Construction equipment exhaust affects air quality both locally and regionally. Emissions of DPM, a TAC, can affect local air quality. This impact is discussed under Impact 5. Emissions of air pollutants that could affect regional air quality were addressed by modeling emissions and comparing them to the SJVAPCD significance thresholds. Construction period air pollutant emissions occurring within the air basin were modeled using the California Emissions Estimator Model, CalEEMod 2016.3.2 model, with project construction information. This model was developed by the South Coast AQMD and other California Air Districts. SJVAPCD recommends the use of this model for construction and operational analysis of land use development projects. The model predicts emissions of ozone precursor pollutants (i.e., ROG and NO_x) and particulate matter (i.e., PM_{10} and $PM_{2.5}$).

Construction build-out scenarios were developed based on the construction schedules, construction vehicle trips, and equipment proposed for use in the project description. Construction emissions were predicted for the construction of the Grape Solar Generating Facility construction. The emissions computed using CalEEMod for this assessment address use of construction equipment, worker vehicle travel, on-site vehicle and truck use, and off-site truck travel by vendors or equipment/material deliveries.

Construction was modeled for 4 different phases as follows:

Phase 1 – Site preparation that would begin June 2022 and last 120 workdays
Phase 2 – Installation of solar arrays that would begin about late August 2022 and last 230 days
Phase 3 – Installation of inverters, transformers, substation and interconnections that would begin about April 2023 and last 110 days

Phase 4 - Installation of the energy storage system that would occur concurrently with Phase 3 and last 65 workdays.

The types, quantity and duration of construction equipment anticipated for construction were provided. The total hours each piece of equipment would operate was divided by the number of workdays in the phase to compute the hours per day that were entered into CalEEMod along with the quantity of equipment. Default horsepower and load factors assigned by CalEEMod were assumed.

For construction vehicle trips, the number of trips and average trip distance were provided for the various types of trips: workers, freight, gravel import, concrete, and water trucks. Some of the freight trips would originate outside of the air basin and only the portion of the trips within the air basin was modeled. A small fraction of the trip travel distance would occur on site where roads are not paved. This was assumed to average one-quarter of a mile. Water trucks were assumed to travel mostly on-site (i.e., 90 percent of the travel length). When not traveling on site, trips were assumed to be made mostly on freeways or large arterial roadways (e.g., highways).

Both criteria air pollutant exhaust and fugitive dust (i.e., PM_{10} and $PM_{2.5}$) were computed by CalEEMod. Note that the unmitigated CalEEMod modeling does not include the effects of SJVAPCD Regulation VIII that would substantially reduce fugitive PM_{10} and $PM_{2.5}$ emissions. *Attachment 1* includes the construction assumptions that were used to model emissions. *Attachment 2* includes the CalEEMod modeling outputs for construction and operational emissions.

Unmitigated and uncontrolled emissions from all phases of construction are reported in Table 5. As shown, unmitigated construction emissions would exceed the applicable SJVAPCD threshold for PM_{10} (exhaust plus fugitive) emissions in 2022. . Unless mitigated, this would represent a *significant* air quality impact. Uncontrolled emissions would not exceed the significance thresholds for other criteria pollutants.

The SJVAPCD Indirect Source Review Rule (Rule 9510) applies to construction of the proposed Project. Regardless of whether a project's construction emissions of regional pollutants would exceed the Air District's significance thresholds for each pollutant, the project is still required to comply with Rule 9510 to ensure that the project contributes its fair share of emissions reductions in order to achieve the basin-wide reduction targets established in the Air District's Ozone and PM attainment plans. Rule 9510 requires that the project reduce uncontrolled construction exhaust emissions by 20 percent for NO_x and 45 percent for PM_{10} from calculated unmitigated levels. The basis for the reductions is use of the CalEEMod emissions for statewide construction fleets. Use of newer equipment could result in substantially lower emissions. SJVAPCD encourages reductions through on-site mitigation measures. (Note: The use of the term "mitigation" under Rule 9510 does not refer to mitigation of impacts under CEQA; i.e., the ISR emission reduction percentages are required without regard to whether the CEQA emissions thresholds are exceeded or not.) Fees to purchase or sponsor off-site reductions through SJVAPCD apply when on-site mitigation measures do not achieve the required percentage of emissions reduction. Using less-polluting construction equipment, such as newer equipment or retrofitting older equipment reduces construction emissions on-site. A combination of on-site and off-site measures can be implemented to meet the overall emission reduction requirements. The uncontrolled emissions reported in Table 5 do not include the reductions required by Rule 9510.

The Grape Solar facility would be decommissioned at the end of its productive life, after 25 to 30 years of operation. The activities associated with deconstruction would be comparable to construction, but emissions are expected to be substantially lower given anticipated reductions in vehicle and equipment emissions to be phased-in over time per State and federal regulations, and also because of the generally lower intensity of equipment use associated with decommissioning. With the application of Regulation VIII dust control requirements, fugitive PM_{10} emissions are likewise expected to be below the applicable significance thresholds, as they are for construction. Therefore, the emissions associated with project decommissioning would be *less-than-significant*.

TABLE 5 Annual Construction Emissions in Tons per Year

Construction Year	**ROG**	**NO_x**	**CO**	**PM_{10}**	**$PM_{2.5}$**
Uncontrolled Emissions *					
2022	1.22	8.38	9.17	**16.55**	2.06
2023	1.11	5.95	8.85	14.50	1.83
Controlled Emissions **					
2022	1.22	6.70	9.17	<9.10	<2.06
2023	1.05	4.76	8.38	<7.98	<1.83
Significance thresholds	10	10	100	15	15
Uncontrolled	No	No	No	YES	No
Controlled	No	No	No	No	No

* Values reported for PM_{10} and $PM_{2.5}$ include fugitive dust and diesel exhaust emissions combined. Fugitive dust emissions do not include the effect of measures implemented under Regulation VIII or required by Kings County.
** Includes effect of effects of applying the Indirect Source Review Rule (9510). Application of Regulation VIII would further reduce PM10 emissions.

Mitigation Measure AQ-1: Apply requirements of Indirect Source Review Rule (9510) and Regulation VIII that would require emission reductions of 20 percent for NOx and 45 percent for PM_{10} (also would reduce $PM_{2.5}$). To the extent feasible, this is to be achieved by requiring that off-road diesel construction equipment greater than 25 horsepower and operating at the site for more than 20 hours meet either U.S. EPA Tier 3 or Tier 4 engine standards for emissions of nitrogen oxides and particulate matter. Any required emissions reductions that cannot be achieved by the use of Tier 3 and Tier 4 equipment shall be subject to ISR fees, as determined by the San Joaquin Air Pollution Control District, to fund off-site mitigations to achieve the remaining required emissions reductions. Application of District Regulation VIII would reduce PM_{10} fugitive dust emissions substantially.

<u>Effectiveness of Mitigation</u>

Table 5 also reports annual construction period emissions with application of District Regulation VIII and implementation of Mitigation Measure AQ-1. The effect of Mitigation Measure AQ-1 was modeled using CalEEMod, assuming all Tier 4 equipment that indicated a 29 percent decrease in NOx emissions would be achieved while all Tier 3 equipment would provide a 3 percent reduction. Therefore, this measure could provide a greater than 20 percent reduction in NOx emissions, which would meet the required reduction under ISR while also maintaining overall NOx emissions below the District's significance threshold of 10 tons per year. Control measures required by SJVAPCD were selected as mitigation measures in the CalEEMod model. SJVAPCD regulations that would apply to construction activities include Regulation VIII, regarding dust control, Rule 4102, regarding creation of a nuisance, Rule 4601 which limits volatile organic compound emissions from architectural coatings, storage and cleanup, and Rule 4641 which limits emissions from asphalt paving materials.

Based on CalEEMod modeling, measures required under Regulation VIII could reduce the fugitive dust component of PM_{10} emissions by over 80 percent. Note that a substantial portion of the estimated mitigated PM_{10} emissions associated with construction would be emitted by worker cars, haul trucks or vendor trucks that travel both near and away from the project site. These emissions would not be directly affected by the application of Indirect Source Review Rule (9510) or *Mitigation Measure AQ-1*, which would only apply to on-site equipment (i.e., haul truck emissions are regulated by State and federal standards, and are not subject to local regulation), with any remaining required emissions reductions achieved through the payment of fees. However, the overall reduction in emissions resulting from these measures would reduce the overall construction emissions, which includes emissions from haul and delivery vehicles, to less than significant levels.

It was previously noted that under Rule 9510 (ISR), the project would be responsible for reducing construction PM_{10} emissions by 45 percent, and NOx emissions by 20 percent. These reductions are required regardless of whether the project emissions exceed the CEQA significance thresholds. This CEQA analysis for unmitigated (or uncontrolled) emissions does not account for ISR reductions, as they are treated separately by the SJVAPCD. (However, it appears that the reductions in emissions that would result from implementation of *Mitigation Measure AQ-1* could meet the ISR emissions reduction requirements for both NOx and PM_{10}, assuming local availability of Tier 3 and Tier 4 equipment). The final emissions calculations for the project will be performed in an Air Impact Assessment (AIA), as required under ISR to determine the specific ISR reductions (i.e., in tons) that will be required for the project.

With implementation of the required mitigation measure, construction period emissions of ROG, NO_x CO, and PM_{10} would be below the thresholds used by SJVAPCD to judge the significance of construction air quality impacts under CEQA. Thus, while the residual construction-related emissions of ozone precursors and particulates (i.e., emissions below the CEQA thresholds) may result in a small decrease in overall air quality, and may therefore have a small adverse health affect (as described earlier in this section under "Criteria Air Pollutants and Their Health Effects"), the overall health impact would not be significant.

Impact 3: Operational Emissions. Proposed Project operational emissions, generated primarily by traffic and maintenance equipment, would increase emissions of <u>ozone precursors and particulate matter</u>, but they would be below GAMAQI significance thresholds. These increases would be *less-than-significant*.

The CalEEMod model was also used to estimate annual emissions from operation of the Grape Solar Project. The first full year that the Grape project could be operational is 2024 and was used as the analysis year. Maintenance vehicle and some off-road equipment usage would occur on-site as well as workers traveling and occasional equipment or vendor deliveries would result in some emissions.

Emissions were computed using the CalEEMod model. Activity input to the model included the on-site travel activity, travel conditions (paved or unpaved), on-site equipment usage and off-site vehicle travel. Note that on-site travel and activity were assumed to occur on unpaved roadways. The project would have internal gravel roadways that must be treated with dust palliatives to minimize dust generation, which was included in the modeling as controlled conditions.

The effect of the proposed project on regional air quality was evaluated by estimating emissions for the full project operating in 2024. The annual emissions associated with the proposed project are shown in Table 6. Output from CalEEMod is contained in *Attachment 2*.

Stationary combustion equipment that could emit air pollution during facility operation is not proposed for the project. Photovoltaic energy projects, such as this one, do not usually include these sources. If stationary sources are included in the project at a later date, they may require permits from SJVAPCD. Such sources could include combustion emissions from standby emergency generators (rated 50 horsepower or greater). These sources would normally result in minor emissions, compared to those from traffic generation and off-road maintenance equipment reported above. Sources of stationary air pollutant emissions complying with all applicable SJVAPCD regulations generally will not be considered to have a significant air quality impact. Stationary sources that are exempt from SJVAPCD permit requirements due to low emission rates would not be considered to have a significant air quality impact.

TABLE 6 Annual Project Operational Emissions in Tons Per Year

Project	**ROG**	**NO_x**	**CO**	**PM_{10}[1]**	**$PM_{2.5}$[1]**
Operations	0.02	0.20	0.33	0.83	0.09
Significance Thresholds	*10*	*10*	*100*[2]	*15*	*15*
Exceed Thresholds?	No	No	No	No	No

[1]Includes both exhaust and fugitive dust emissions.
[2]Significant if emissions exceed 100 tons per year and then contribute to violation of the NAAQS/CAAQS

As previously mentioned, the project is subject to SJVAPCD's ISR Rule 9510 to reduce NO_x and PM_{10} emissions. Although the project's operational emissions of regional pollutants would not exceed the District's significance thresholds for each pollutant, as shown in Table 6, the project is still required to comply with Rule 9510, to ensure that the project contributes its share of emissions reductions in order to achieve the basin-wide reduction targets established in the Air District's Ozone and PM_{10} attainment plans. Under Rule 9510, the project would be required to reduce operational NO_x emissions by 33 percent and operational PM_{10} emissions by 50 percent over 10 years. The emissions in Table 6 do not reflect any reductions that may be required under ISR.

Mitigation Measure for Impact 3: None Required.

Impact 4: Carbon monoxide concentrations from operational traffic. Mobile emissions generated by project traffic would increase carbon monoxide concentrations at intersections in the project vicinity. However, resulting concentrations would be below ambient air quality standards, and therefore, considered a *less-than-significant* impact.

Project traffic would slightly increase concentrations of CO along roadways providing access to the project. Carbon monoxide is a localized air pollutant, where highest concentrations are found very near sources. The major source of CO is automobile traffic. Elevated concentrations, therefore, are usually only found near areas of high traffic volume and congestion.

Emissions and ambient concentrations of CO have decreased greatly in recent years. These improvements are due largely to the introduction of cleaner burning motor vehicles and reformulated motor vehicle fuels. No exceedances of the State or federal CO standards have been recorded at any of San Joaquin Valley's monitoring stations in the past 15 years. The San Joaquin Valley Air Basin has attained the State and National CO standards.

However, despite this progress, localized CO concentrations are still a concern in the San Joaquin Valley and are addressed through the SJVAPCD screening method that can be used to determine with fair certainty that the effect a project has on any given intersection would not cause a potential CO hotspot. A project can be said to have no potential to create a CO violation or create a localized hotspot if either of the following conditions are not met: level of service (LOS) on one or more streets or intersections would be reduced to LOS E or F; or the project would substantially worsen an already LOS F street or intersection within the project vicinity. As the proposed project will not do either of these, the potential impact on CO would be considered *less-than-significant*.

Mitigation Measure for Impact 4: None Required.

Impact 5: Exposure of Sensitive Receptors to Toxic Air Contaminants. Construction activity, delivery trucks, employee traffic and emissions from onsite vehicles used in maintenance activities would expose nearby receptors to toxic air contaminants. Based on the low levels of predicted construction toxic air contaminants and the distance to the nearest sensitive receptor, a screening health risk assessment to assess the potential cancer risk would not be required and the emissions impacts would be *less-than-significant*.

The TAC of concern is DPM emitted from diesel-fueled vehicles and equipment during construction of the project.

For the Grape Solar project, the highest daily levels of DPM would be emitted during construction activities from use of heavy-duty diesel equipment such as bulldozers, excavators, loaders, graders and diesel-fueled haul trucks. However, these emissions would be intermittent, vary throughout the project site area, and be of a temporary duration (approximately 14 months of total construction activity). During project operations, low-level DPM emissions would result from worker vehicles and maintenance activities, but they would be constant over the lifetime of the project. Operational DPM emissions would mainly result from the use of pickup trucks with a portable water trailer (and pump) which would be used for panel cleaning.

Levels of DPM emissions can be generally inferred from PM_{10} emissions, of which diesel exhaust constitutes a substantial component. Table 5, above, shows that PM_{10} emissions from solar project construction would be well below the applicable significance threshold. Table 6, above, shows that PM_{10} emissions from operational activities would be well below the significance threshold.

Because of the relatively small levels of DPM emissions during project construction and operation, and due to the substantial distances to the nearest sensitive receptors (e.g., the nearest residence is at least 3,000 feet from the nearest project boundary), DPM emissions from project construction would disperse to negligible levels, and thus the health impacts associated with exposure to DPM from project construction and operation are not anticipated to be significant. Therefore, the Grape Solar Project would result in a *less-than-significant impact* in terms of exposing sensitive receptors to substantial concentrations of TACs.

Mitigation Measure for Impact 5: None required.

Impact 6: Odors. The project would result in temporary odors during construction. This impact would be *less-than-significant*.

During construction, the various diesel powered vehicles and equipment in use on-site would create localized odors. These odors would be temporary and not likely to be noticeable for extended periods of time much beyond the project's site boundaries. The potential for diesel odor impacts is, therefore, *less-than-significant*.

During project operations, the project is not expected to generate any objectionable odors. Therefore, the odor impacts associated with operations would be *less-than-significant*.

Mitigation Measure for Impact 6: None proposed.

Impact 7: Consistency with Clean Air Planning Efforts. The project would not conflict with the current clean air plan or obstruct its implementation. This would be a *less-than-significant impact*.

The GAMAQI does not include methodologies for assessing the effect of a project on consistency with clean air plans developed by the SJVAPCD. Regional clean air plans developed by SJVAPCD rely on local land use designations to develop population and travel projections that are the basis of future emissions inventories. Air pollution control plans are aimed at reducing these projected future emissions. The project land uses would not alter population and vehicle related emissions projections contained in regional clean air planning efforts in any measurable way, and would not conflict with achievement of the control plans aimed at reducing these projected emissions. Therefore, the project would not conflict with or obstruct implementation of efforts outlined in the region's air pollution control plans to attain or maintain ambient air quality standards. This would be a *less-than-significant* impact.

Also, as discussed above, in 2005 the SJVAPCD adopted the ISR Rule in order to fulfill the District's emission reduction commitments in its PM_{10} and Ozone attainment plans. The District has determined that implementation and compliance with the ISR would reduce the cumulative PM_{10} and NO_X impacts of growth anticipated in the air quality plans to a less-than-significant level. Since the project would be required to implement the emissions reductions under ISR, it would fulfill its share of achieving the District's emission reduction commitments in the PM_{10} and Ozone attainment plans. Therefore, the project would result in a *less-than-significant impact* since it would not conflict with or obstruct implementation of the applicable air quality plans.

Mitigation Measure for Impact 7: None required.

CUMULATIVE AIR QUALITY IMPACTS

Methodology

The SJVAPCD has developed criteria to determine if a development Project could result in potentially significant regional emissions. According to the GAMAQI, any proposed project that would individually have a significant air quality impact (i.e., exceed significance thresholds for ROG or NO_x) would also be considered to have a significant cumulative air quality impact. Impacts of local pollutants (CO and TACs) are cumulatively significant when modeling shows that the combined emissions from the project and other existing and planned projects will exceed air quality standards. The GAMAQI further states that "a Lead Agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or mitigation program, including, but not limited to an air quality attainment or maintenance plan that provides specific requirements that will avoid or substantially lessen the cumulative problem within the geographic area in which the project is located" (SJVAPCD 2015, p. 66). For local impacts of PM_{10} from unrelated construction projects, the GAMAQI recommends a qualitative approach where construction activities from unrelated projects in the area should be examined to determine if enhanced dust suppression measures are necessary.

Regional Air Pollutants

As discussed under 'Significance Criteria" above, cumulative ozone impacts would be considered significant - if the project-specific emissions exceed the SJVAPCD significance thresholds for ozone precursors ROG or NO_x, or the project is not consistent with the regional clean air plan. As discussed in Impact 2 (and shown in Table 5) above, project-specific construction emissions of ozone precursor pollutants (ROG and NO_x) and PM were found to be less-than-significant after mitigation. As discussed in Impact 3 (and shown in Table 6) above, project-specific operational emissions of ozone precursor pollutants (ROG and NO_x) and PM were found to be less-than-significant without mitigation. As discussed under Impact 7 above, the project would be consistent with clean air planning efforts and would not conflict with or obstruct their implementation. Therefore, the project contribution to cumulative regional air quality impacts would be *less-than-significant*.

Local Air Pollutant Emissions

Construction period PM_{10} emissions would be localized. With implementation of SJVAPCD Regulation VIII and dust control requirements imposed by the county, construction period impacts would be less-than-significant. Additional construction that may occur in the area concurrently with the project would be subject to SJVAPCD Regulation VIII, as well as the District's ISR Rule 9510, which would reduce cumulative construction emissions to less-than-significant levels. Operational emissions would also be less-than-significant with County-imposed measures to control fugitive dust emissions.

In summary, the cumulative project impacts to localized air quality impacts would be *less-than-significant.*

Cumulative Toxic Air Pollutant Impacts

As discussed above, the project would not have a significant impact related to community health risk from project construction or operation and, therefore, would also not contribute to a cumulatively considerable community risk impact in the project vicinity.

Summary of Cumulative Contribution to Air Quality Impacts

The project would not contribute to local cumulative air quality impacts with respect to any standard or significance criteria. In addition, the project's contribution to cumulative regional air quality impacts would be less than considerable. In conclusion, the project would not have a cumulatively significant impact on air quality.

Greenhouse Gas Emissions

GHG emissions in terms of CO_2e are low for both the construction and operational phases of the proposed project. A photovoltaic power production facility inherently represents "best performance standards" as compared to other typical forms of electrical power production, i.e., such as fossil-fueled power plants. The operation of the project would provide electric power with negligible GHG emissions over the life of the project compared with traditional fossil-fueled power plants. Therefore, the project is consistent with State GHG policy to encourage solar power development as a means to reduce fossil fuels and GHG emissions and improve air quality. GHG Emissions are reported in Table 7 for both construction and operation of the project.

TABLE 7 Annual Project GHG Emissions in Metric Tons Per Year

Phase	GHG Emissions
2022 Construction Activity	4,185
2023 Construction Activity + 25% Operation	2,944
2024 Operation	125

REFERENCES

BAAQMD 2011	Bay Area Air Quality Management District (BAAQMD). 2011. BAAQMD CEQA Air Quality Guidelines. May (updated May 2017). http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en
CARB 2000	California Air Resources Board (CARB). 2000. *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*. October. https://www.arb.ca.gov/diesel/documents/rrpFinal.pdf
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CARB 2012	California Air Resources Board (CARB) 2012. Overview: Diesel Exhaust and Health. https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health Accessed May 20, 2018.
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CARB 2016f	California Air Resources Board (CARB). 2016. *iADAM: Air Quality Data Statistics*. https://www.arb.ca.gov/adam/index.html accessed 10/18/2018.

CARB 2016g	California Air Resources Board (CARB). 2016. *2016 Plan for the 2008 8-Hour Ozone Standard*. June. http://valleyair.org/Air_Quality_Plans/Ozone-Plan-2016.htm
CARB 2018	California Air Resources Board (CARB). 2009. California State and Local Air Monitoring Plan – 2009. June. https://www.arb.ca.gov/adam/netrpt/report_2009.pdf Note this plan is currently being updated – see: California Air Resources Board 2018 Annual Network Plan
FHWA 2016	Federal Highway Administration, 2016. *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents.* https://www.fhwa.dot.gov/environMent/air_quality/air_toxics/policy_and_guidance/msat/
Kings County 2012	Kings County. 2012. *Initial Study and Negative Declaration – Conditional Use Permit No. 11-03 (SunPower Henrietta Solar Project)*. June.
SJVAPCD 2004	San Joaquin Valley Air Pollution Control District (SJVAPCD). 2004. *Extreme Ozone Attainment Demonstration Plan.* October.
SJVAPCD 2007	San Joaquin Valley Air Pollution Control District (SJVAPCD). 2007. *2007 Ozone Plan Volumes 1-3.* April.
SJVAPCD 2015a	San Joaquin Valley Air Pollution Control District (SJVAPCD). 2015. *Guidance for Assessing and Mitigating Air Quality Impacts (GAMAQI) – Final Draft*. March. http://www.valleyair.org/transportation/GAMAQI_3-19-15.pdf
SJVAPCD 2015b	San Joaquin Valley Air Pollution Control District (SJVAPCD). 2015. *Air Quality Thresholds of Significance – Toxic Air Contaminants*. July. http://www.valleyair.org/transportation/0714-GAMAQI-TACs-Thresholds-of-Significance.pdf
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SJVAPCD 2017	San Joaquin Valley Air Pollution Control District (SJVAPCD). 2017.

Rule 9510 Indirect Source Review (ISR) (Adopted December 15, 2005; Amended December 21, 2017, but not in effect until March 21, 2018).
http://www.valleyair.org/rules/currntrules/r9510-a.pdf

Attachment 1: Activity Assumptions used for CalEEMod Modeling

GRAPE SOLAR - SGF Construction Inputs Rev 8/12/20 - 2/16/2021

Construction - Off-Site Vehicle Usage

Vehicles	Estimated Usage		Round Trips per Unit	I&R Calcualtions for CalEEMod										Schedule
	Units	Miles/Round Trip	250 MW SGF	Trips/day	Total Trips	Total VMT/Phase	VMT/trip	Type	Type	Trips	Trips/day	Trip Length	On site travel	Overall - 14 months June, 2022 - November, 2023
Phase 1 – Site Preparation														
Water Trucks	5	3	240	15.0	1200.0	3600	3	Haul (HHDT)	Worker	34,320	286	90	0.3%	Phase 1 - 120 workdays/24 weeks
Flat Bed Trucks (Equipment Transport)	7	85	60	5	420.0	35700	85	Vendor	Vendor	1,258	10	199	0.1%	
Gravel Trucks (End Dump)(Delivery)	32	52	240	96	7680.0	399360	52	Haul (HHDT)	Haul	9,630	80	64	0.4%	
Concrete Delivery Trucks	4	50	22	1	88.0	4400	50	Vendor	total	45,208	8827.5			
Freight Trucks (Delivery)	25	280	30	9	750.0	210000	280	Haul (HHDT)						
Worker Vehicles	286	90	120	429	34320.0	3088800	90	Worker						
Phase 2 – Installation of Solar Arrays														Phase 2 - 230 workdays/46 weeks
Water Trucks	4	3	460	16.4	1840.0	5520	3	Haul (HHDT)	Worker	67,850	295	90	0.3%	August, 2022 - July, 2023
Flat Bed Trucks (Equipment Transport)	16	85	230	32.7	3680.0	312800	85	Vendor	Vendor	3,680	16	142	0.2%	(12 week overlap with Phase 1)
Freight Trucks (Delivery)	25	280	30	6.7	750.0	210,000.00	280	Haul (HHDT)	Haul	2,590	11	83	0.3%	
Worker Vehicles	295	90	230	603.1	67850.0	6106500	90	Worker	total	74,120	2590			
Phase 3 – Installation of Inverters, Transformers, Substation, Interconnection														Phase 3 - 110 workdays/22 weeks
Water Trucks	1	3	110	2.0	110.0	330	3	Haul (HHDT)	Worker	3,300	30	90	0.3%	April 2023 - November, 2023
Flat Bed Trucks (Equipment Transport)	3	85	110	6.0	330.0	28050	85	Vendor MHDT	Vendor	386	4	80	0.3%	(12 week overlap with Phase 2)
Concrete Delivery Trucks	4	50	14	1.0	56.0	2800	50	Vendor HHDT	Haul	110	1	3	90%	
Worker Vehicles	30	90	110	60.0	3300.0	297000	90	worker	total	3,796				
Energy Storage System - Installation														Occurs During Phase 3
Water Trucks	1	3	65	1.2	65.0	195	3	Haul (HHDT)	Worker	5,850	90	90	0.3%	65 workdays/22 weeks
Contrete Delivery Trucks	7	50	27	3.4	189.0	9450	50	Vendor MHDT	Vendor	189	3	50	0.5%	April 2023 - July, 2023
Gravel Trucks (End Dump)(Delivery)	7	52	13	1.7	91.0	4732	52	Haul	Haul	551	5	203	0.1%	
Freight (Delivery)	5	280	75	6.8	375.0	105000	280	Haul (HHDT)	total	6,590	551			
Equipment Transport Trucks (Delivery)	4	85	5	0.4	20.0	1700	85	Haul						
Worker Vehicles	90	90	65	106.4	5850.0	526500	90	worker						
Note, freight deliveries (400mi roundtrip) limited to travel within air basin														

Construction - On-Site Equipment Usage

Equipment	Estimated Usage: Units	Estimated Usage: Hours/Day (5 days/week)	Estimated Usage: Days per Unit 250 MW SGF	CalEEMod Inputs: Qty	CalEEMod Inputs: Average hrs/phas	CalEEMod Inputs: Days		Schedule
								Overall - 16 months
Phase 1 – Site Preparation								Jan 3, 2022 - April 21, 2023
Water Trucks (10,000 gallon)	5	4	45			110	included in vehicle trips	
Graders	3	7	35	3	2.2	110		Phase 1 - 120 workdays/24 weeks
						110	included in vehicle trips	Jan 3, 2022 - June 17, 2022
Skid Loaders	18	7	30	18	1.9	110		
Front-End Loaders	3	7	35	3	2.2	110		
Roller Compactors	9	7	40	9	2.5	110		
Backhoe	1	7	5	1	0.3	110		
Pickup Trucks	6	4	45			110	included in vehicle trips	
Phase 2 – Installation of Solar Arrays								Phase 2 - 230 workdays/46 weeks
Water Trucks	4	7	230		7.0		included in vehicle trips	March 28, 2022 - Feb 10, 2023
					0.0			(12 week overlap with Phase 1)
Skid Loaders	6	7	135	6	4.1	230		
Tractors – post drivers	6	7	135	6	4.1	230		
Forklifts	22	7	145	22	4.4	230		
				0	0.0	230		
Welders	22	7	145	22	4.4	230		
Trenchers	6	4	120	6	2.1	230		
Phase 3 – Installation of Inverters, Transformers, Substation, Interconnection								Phase 3 - 110 workdays/22 weeks
Water Trucks	1	4	20		0.7	110	included in vehicle trips	Nov 21, 2022 - April 21, 2023
Skid Loaders	2	7	30	2	1.9	110		(12 week overlap with Phase 2)
Front-End Loaders	1	7	7	1	0.4	110		
Roller Compactors	1	7	7	1	0.4	110		
Pile Drivers	2	7	30	2	1.9	110		
Trenchers	4	4	110	4	4.0	110		
Backhoes	2	4	65	2	2.4	110		
Cranes	2	2	110	2	2.0	110		
Aerial Lifts	2	4	65	2	2.4	110		
Asphalt Pavers	1	4	5	1	0.2	110		
Energy Storage System - Installation								Occurs During Phase 3
Water Trucks	1	4	65		4.0	65		65 workdays/11 weeks
Skid Loaders	2	7	33	2	3.6	65		Nov 21, 2022 - February 21, 2023
Front-End Loaders	2	4	33	2	2.0	65		
Roller Compactors	2	4	33	2	2.0	65		
Pile Drivers	1	4	4	1	0.2	65		
Trenchers	7	4	65	7	4.0	65		
Backhoes	3	4	44	3	2.7	65		
Cranes	1	4	65	1	4.0	65		
Aerial Lifts	0	0	0	0	0.0	65		
Pickup Trucks	2	4	65				included in vehicle trips	

GRAPE SOLAR - OPERATIONAL VEHICLE AND EQUIPMENT USE (Rev 8/12/20)

Grape Solar - Operations - On-Site Vehicle and Equipment Usage

Equipment and Vehicle Usage During SolarFacility Operations and Maintenance

	Estimated Usage (Annual)				
Equipment	**Units**	**Hours/Day/Unit**	**Total Days/Unit/Year**	**hours/day**	
All-Terrain Vehicle (ATV)	2	6	40	0.7	
Tractor	1	3	40	0.3	
Portable Generator	2	3	40	0.3	
Portable Water Trailer w/Pump	1	2	40	0.2	
Vehicles	**Units**	**Daily Miles/ Unit**	**Total Days/ Unit/Year**		
Pickup Truck (Routine O&M)	6	20	40	480	4800
Pickup Truck (Panel Washing)	2	30	40	160	2400
				640	7200
				1.75	11.3
				trip/day	mi/trip
				90% on dirt	

Grape Solar - Operations - Off-Site Vehicle Usage

Personnel Commuting to Solar Facility

	Estimated Annual			**Miles/Round**		
Personnel	**Workers**	**Days**	**Round Trips**	**Trip**	**trips**	**vmt**
Permanent	2	252	504	90	1,008	45,360
Repair Crew	20	25	500	90	1,000	45,000
Shepherds	3	110	330	90	660	29,700
Panel Washing Crew	25	40	1,000	90	2,000	90,000
Total Annual Round Trips			2,334			
Source: Kings County CUPs				Note: on-site - workers park at project entrance on Nevada Ave		
					4,668	210,060
					12.79	45
					trip/day	mi/trip
					on paved	

Total		
	14.54	**trip/day**
	40.93	**mi/trip**
	3%	**% on dirt (on-site)**

Attachment 2: CalEEMod Output

Grape Solar

San Joaquin Valley Unified APCD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	1,753.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2023
Utility Company	Statewide Average				
CO2 Intensity (lb/MWhr)	1001.57	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Based on total site acreage

Construction Phase - Based on provided schedule 10-2-2020 phone conversation

Off-road Equipment - water trucks and pickups modeled as on road. other = pile driving

Off-road Equipment - Water trucks = on road trucks modeled as on road. Pile driver = other

Off-road Equipment - Water trucks and flatbed trucks modeled as on-road.

Off-road Equipment - Compactor = Crawler, Water Trucks modeled as on road trucks, traveling 90 miles ea/day

Trips and VMT - Computed from construction traffic provided. Water (HHDT) and flatbed trucks (MHDT) added

On-road Fugitive Dust - Computed 0.25 mi on-site travel Use Freeway/Major Collector Road Silt Loading (0.015 and 0.032 g/m2) since most travel on highways. 12% moisture content for road watering entered in mitigation

Demolition -

Grading - no material import/export. Assume 5% of site disturbed per day

Vehicle Trips - Computed operational trips

Road Dust - 97% travel on-site but on unpaved gravel roads at 15mph. Used average collecter/freeway travel. assume 10% moisture content to represent dust pallitives or gravel

Construction Off-road Equipment Mitigation - Enhanced Dust BMPs and Tier 4

Operational Off-Road Equipment - Computed from provided data. Assume skid steer loader as ATV

Table Name	Column Name	Default Value	New Value
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tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
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tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	22.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
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tblConstEquipMitigation	Tier	No Change	Tier 4 Final
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tblTripsAndVMT	VendorTripLength	6.60	50.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	VendorTripNumber	0.00	3.00
tblTripsAndVMT	WorkerTripLength	16.80	90.00
tblTripsAndVMT	WorkerTripLength	16.80	90.00
tblTripsAndVMT	WorkerTripLength	16.80	90.00
tblTripsAndVMT	WorkerTripLength	16.80	90.00
tblTripsAndVMT	WorkerTripNumber	85.00	286.00
tblTripsAndVMT	WorkerTripNumber	0.00	295.00
tblTripsAndVMT	WorkerTripNumber	0.00	30.00

tblTripsAndVMT	WorkerTripNumber	0.00	90.00
tblVehicleTrips	CC_TL	6.60	40.93
tblVehicleTrips	CNW_TL	6.60	40.93
tblVehicleTrips	CW_TL	14.70	40.93
tblVehicleTrips	CW_TTP	0.00	100.00
tblVehicleTrips	HO_TL	0.00	40.93
tblVehicleTrips	HS_TL	0.00	40.93
tblVehicleTrips	HW_TL	0.00	40.93
tblVehicleTrips	PR_TP	0.00	100.00
tblVehicleTrips	ST_TR	0.00	14.54
tblVehicleTrips	SU_TR	0.00	14.54
tblVehicleTrips	WD_TR	0.00	14.54

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	1.2204	8.3786	9.1659	0.0454	16.3725	0.1811	16.5535	1.8872	0.1702	2.0574	0.0000	4,180.6627	4,180.6627	0.1810	0.0000	4,185.1880
2023	1.1058	5.9510	8.8499	0.0321	14.2734	0.2311	14.5044	1.6128	0.2165	1.8293	0.0000	2,908.6508	2,908.6508	0.1832	0.0000	2,913.2304
Maximum	**1.2204**	**8.3786**	**9.1659**	**0.0454**	**16.3725**	**0.2311**	**16.5535**	**1.8872**	**0.2165**	**2.0574**	**0.0000**	**4,180.6627**	**4,180.6627**	**0.1832**	**0.0000**	**4,185.1880**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.9537	6.7146	9.2785	0.0454	2.4952	0.0483	2.5435	0.4495	0.0459	0.4953	0.0000	4,180.6622	4,180.6622	0.1810	0.0000	4,185.1875
2023	0.7219	3.5342	8.8404	0.0321	2.0545	0.0436	2.0982	0.3534	0.0410	0.3944	0.0000	2,908.6501	2,908.6501	0.1832	0.0000	2,913.2297
Maximum	**0.9537**	**6.7146**	**9.2785**	**0.0454**	**2.4952**	**0.0483**	**2.5435**	**0.4495**	**0.0459**	**0.4953**	**0.0000**	**4,180.6622**	**4,180.6622**	**0.1832**	**0.0000**	**4,185.1875**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**27.97**	**28.48**	**-0.57**	**0.00**	**85.15**	**77.69**	**85.05**	**77.06**	**77.54**	**77.11**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	**Start Date**	**End Date**	**Maximum Unmitigated ROG + NOX (tons/quarter)**	**Maximum Mitigated ROG + NOX (tons/quarter)**
2	**4-3-2022**	**7-2-2022**	1.0411	0.9285
3	**7-3-2022**	**10-2-2022**	4.1146	3.4081
4	**10-3-2022**	**1-2-2023**	4.4557	3.3249
5	**1-3-2023**	**4-2-2023**	2.4225	1.5595
6	**4-3-2023**	**7-2-2023**	3.5861	2.1230
7	**7-3-2023**	**9-30-2023**	0.9672	0.5213
		Highest	4.4557	3.4081

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Mobile	0.0117	0.1094	0.1979	1.1400e-003	0.8256	7.0000e-004	0.8263	0.0854	6.6000e-004	0.0861	0.0000	105.6620	105.6620	3.0000e-003	0.0000	105.7371
Offroad	9.3100e-003	0.0920	0.1320	2.2000e-004		4.0400e-003	4.0400e-003		3.9300e-003	3.9300e-003	0.0000	18.8124	18.8124	2.9300e-003	0.0000	18.8857
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0210**	**0.2014**	**0.3299**	**1.3600e-003**	**0.8256**	**4.7400e-003**	**0.8304**	**0.0854**	**4.5900e-003**	**0.0900**	**0.0000**	**124.4744**	**124.4744**	**5.9300e-003**	**0.0000**	**124.6228**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0117	0.1094	0.1979	1.1400e-003	0.8256	7.0000e-004	0.8263	0.0854	6.6000e-004	0.0861	0.0000	105.6620	105.6620	3.0000e-003	0.0000	105.7371
Offroad	9.3100e-003	0.0920	0.1320	2.2000e-004		4.0400e-003	4.0400e-003		3.9300e-003	3.9300e-003	0.0000	18.8124	18.8124	2.9300e-003	0.0000	18.8857
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0210**	**0.2014**	**0.3299**	**1.3600e-003**	**0.8256**	**4.7400e-003**	**0.8304**	**0.0854**	**4.5900e-003**	**0.0900**	**0.0000**	**124.4744**	**124.4744**	**5.9300e-003**	**0.0000**	**124.6228**

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	6/1/2022	11/15/2022	5	120	120 days
2	Installation of Solar Arrays	Building Construction	8/28/2022	7/14/2023	5	230	230 days
3	Installation of Inverters, transformers, etc.	Building Construction	4/21/2023	9/21/2023	5	110	110 days
4	Installation of Energy Storage System	Building Construction	4/21/2023	7/20/2023	5	65	65 days

Acres of Grading (Site Preparation Phase): 87

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	3	2.20	187	0.41
Site Preparation	Pavers	0	0.70	130	0.42
Site Preparation	Rollers	9	2.50	80	0.38
Site Preparation	Rubber Tired Dozers	0	7.00	247	0.40
Site Preparation	Rubber Tired Loaders	3	2.20	203	0.36
Site Preparation	Skid Steer Loaders	18	1.90	65	0.37
Site Preparation	Tractors/Loaders/Backhoes	1	0.30	97	0.37
Installation of Solar Arrays	Cranes	0	7.00	231	0.29
Installation of Solar Arrays	Forklifts	22	4.40	89	0.20
Installation of Solar Arrays	Generator Sets	0	8.00	84	0.74
Installation of Solar Arrays	Skid Steer Loaders	6	4.10	65	0.37
Installation of Solar Arrays	Tractors/Loaders/Backhoes	6	4.10	97	0.37
Installation of Solar Arrays	Trenchers	6	2.10	78	0.50
Installation of Solar Arrays	Welders	22	4.40	46	0.45
Installation of Inverters, transformers, etc.	Aerial Lifts	2	2.40	63	0.31
Installation of Inverters, transformers, etc.	Cranes	2	2.00	231	0.29
Installation of Inverters, transformers, etc.	Forklifts	0	3.60	89	0.20

Installation of Inverters, transformers, etc.	Generator Sets	0	8.00	84	0.74
Installation of Inverters, transformers, etc.	Other Construction Equipment	2	1.90	172	0.42
Installation of Inverters, transformers, etc.	Pavers	1	0.20	130	0.42
Installation of Inverters, transformers, etc.	Rollers	1	1.40	80	0.38
Installation of Inverters, transformers, etc.	Rubber Tired Loaders	1	0.40	203	0.36
Installation of Inverters, transformers, etc.	Skid Steer Loaders	2	1.90	65	0.37
Installation of Inverters, transformers, etc.	Tractors/Loaders/Backhoes	2	2.40	97	0.37
Installation of Inverters, transformers, etc.	Trenchers	4	4.00	78	0.50
Installation of Inverters, transformers, etc.	Welders	0	8.00	46	0.45
Installation of Energy Storage System	Aerial Lifts	0	0.00	63	0.31
Installation of Energy Storage System	Cranes	1	4.00	231	0.29
Installation of Energy Storage System	Forklifts	0	8.00	89	0.20
Installation of Energy Storage System	Generator Sets	0	8.00	84	0.74
Installation of Energy Storage System	Other Construction Equipment	1	0.20	172	0.42
Installation of Energy Storage System	Rollers	2	2.00	80	0.38
Installation of Energy Storage System	Rubber Tired Loaders	2	2.00	203	0.36
Installation of Energy Storage System	Skid Steer Loaders	2	3.60	65	0.37
Installation of Energy Storage System	Tractors/Loaders/Backhoes	3	2.70	97	0.37
Installation of Energy Storage System	Trenchers	7	4.00	78	0.50
Installation of Energy Storage System	Welders	0	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	34	286.00	10.00	9,630.00	90.00	270.00	73.00	LD_Mix	HDT_Mix	HHDT
Installation of Solar Arrays	62	295.00	16.00	2,590.00	90.00	167.00	118.00	LD_Mix	HDT_Mix	HHDT
Installation of Inverters	17	30.00	4.00	110.00	90.00	80.00	3.00	LD_Mix	HDT_Mix	HHDT
Installation of Energy Storage System	18	90.00	3.00	551.00	90.00	50.00	203.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Replace Ground Cover

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0461	0.0000	0.0461	4.9800e-003	0.0000	4.9800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0813	0.9432	0.8358	1.6200e-003		0.0391	0.0391		0.0360	0.0360	0.0000	142.1394	142.1394	0.0460	0.0000	143.2887
Total	**0.0813**	**0.9432**	**0.8358**	**1.6200e-003**	**0.0461**	**0.0391**	**0.0853**	**4.9800e-003**	**0.0360**	**0.0410**	**0.0000**	**142.1394**	**142.1394**	**0.0460**	**0.0000**	**143.2887**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.1002	2.8807	0.5389	0.0121	1.8893	0.0117	1.9010	0.2211	0.0112	0.2323	0.0000	1,148.7866	1,148.7866	0.0248	0.0000	1,149.4060
Vendor	0.0382	0.9144	0.1952	4.7400e-003	0.2518	5.2100e-003	0.2570	0.0435	4.9800e-003	0.0485	0.0000	450.6629	450.6629	3.8300e-003	0.0000	450.7586
Worker	0.3861	0.2892	2.8879	0.0103	6.1305	6.8200e-003	6.1373	0.7130	6.2800e-003	0.7193	0.0000	931.1937	931.1937	0.0208	0.0000	931.7139
Total	**0.5245**	**4.0843**	**3.6220**	**0.0271**	**8.2716**	**0.0238**	**8.2953**	**0.9776**	**0.0225**	**1.0001**	**0.0000**	**2,530.6432**	**2,530.6432**	**0.0494**	**0.0000**	**2,531.8785**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					9.0000e-003	0.0000	9.0000e-003	9.7000e-004	0.0000	9.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0303	0.4030	1.0173	1.6200e-003		4.8800e-003	4.8800e-003		4.6900e-003	4.6900e-003	0.0000	142.1392	142.1392	0.0460	0.0000	143.2885
Total	**0.0303**	**0.4030**	**1.0173**	**1.6200e-003**	**9.0000e-003**	**4.8800e-003**	**0.0139**	**9.7000e-004**	**4.6900e-003**	**5.6600e-003**	**0.0000**	**142.1392**	**142.1392**	**0.0460**	**0.0000**	**143.2885**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.1002	2.8807	0.5389	0.0121	0.3021	0.0117	0.3138	0.0574	0.0112	0.0686	0.0000	1,148.7866	1,148.7866	0.0248	0.0000	1,149.4060
Vendor	0.0382	0.9144	0.1952	4.7400e-003	0.0869	5.2100e-003	0.0921	0.0247	4.9800e-003	0.0297	0.0000	450.6629	450.6629	3.8300e-003	0.0000	450.7586
Worker	0.3861	0.2892	2.8879	0.0103	0.9571	6.8200e-003	0.9639	0.1738	6.2800e-003	0.1800	0.0000	931.1937	931.1937	0.0208	0.0000	931.7139
Total	**0.5245**	**4.0843**	**3.6220**	**0.0271**	**1.3460**	**0.0238**	**1.3698**	**0.2559**	**0.0225**	**0.2783**	**0.0000**	**2,530.6432**	**2,530.6432**	**0.0494**	**0.0000**	**2,531.8785**

3.3 Installation of Solar Arrays - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2708	1.9708	2.2374	3.1800e-003		0.1071	0.1071		0.1013	0.1013	0.0000	259.6000	259.6000	0.0631	0.0000	261.1769
Total	**0.2708**	**1.9708**	**2.2374**	**3.1800e-003**		**0.1071**	**0.1071**		**0.1013**	**0.1013**	**0.0000**	**259.6000**	**259.6000**	**0.0631**	**0.0000**	**261.1769**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0165	0.4600	0.0889	2.0100e-003	2.9702	1.9800e-003	2.9722	0.3052	1.8900e-003	0.3071	0.0000	191.6665	191.6665	3.1100e-003	0.0000	191.7442
Vendor	0.0287	0.6966	0.1477	3.5400e-003	0.3420	3.8700e-003	0.3459	0.0478	3.7000e-003	0.0515	0.0000	336.2409	336.2409	3.3500e-003	0.0000	336.3246
Worker	0.2987	0.2237	2.2341	7.9600e-003	4.7425	5.2800e-003	4.7478	0.5516	4.8600e-003	0.5564	0.0000	720.3728	720.3728	0.0161	0.0000	720.7752
Total	**0.3439**	**1.3803**	**2.4706**	**0.0135**	**8.0548**	**0.0111**	**8.0659**	**0.9046**	**0.0105**	**0.9151**	**0.0000**	**1,248.2801**	**1,248.2801**	**0.0226**	**0.0000**	**1,248.8440**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0550	0.8470	2.1685	3.1800e-003		8.5600e-003	8.5600e-003		8.2300e-003	8.2300e-003	0.0000	259.5997	259.5997	0.0631	0.0000	261.1766

Total	**0.0550**	**0.8470**	**2.1685**	**3.1800e-003**		**8.5600e-003**	**8.5600e-003**		**8.2300e-003**	**8.2300e-003**	**0.0000**	**259.5997**	**259.5997**	**0.0631**	**0.0000**	**261.1766**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0165	0.4600	0.0889	2.0100e-003	0.3203	1.9800e-003	0.3223	0.0385	1.8900e-003	0.0403	0.0000	191.6665	191.6665	3.1100e-003	0.0000	191.7442
Vendor	0.0287	0.6966	0.1477	3.5400e-003	0.0794	3.8700e-003	0.0833	0.0198	3.7000e-003	0.0235	0.0000	336.2409	336.2409	3.3500e-003	0.0000	336.3246
Worker	0.2987	0.2237	2.2341	7.9600e-003	0.7404	5.2800e-003	0.7457	0.1344	4.8600e-003	0.1393	0.0000	720.3728	720.3728	0.0161	0.0000	720.7752
Total	**0.3439**	**1.3803**	**2.4706**	**0.0135**	**1.1402**	**0.0111**	**1.1513**	**0.1927**	**0.0105**	**0.2031**	**0.0000**	**1,248.2801**	**1,248.2801**	**0.0226**	**0.0000**	**1,248.8440**

3.3 Installation of Solar Arrays - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3872	2.8892	3.4551	4.9500e-003		0.1443	0.1443		0.1365	0.1365	0.0000	403.9318	403.9318	0.0965	0.0000	406.3435
Total	**0.3872**	**2.8892**	**3.4551**	**4.9500e-003**		**0.1443**	**0.1443**		**0.1365**	**0.1365**	**0.0000**	**403.9318**	**403.9318**	**0.0965**	**0.0000**	**406.3435**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0177	0.4242	0.1189	3.0300e-003	2.9773	1.2100e-003	2.9785	0.3078	1.1600e-003	0.3090	0.0000	288.1735	288.1735	3.5500e-003	0.0000	288.2623
Vendor	0.0304	0.6765	0.1925	5.3800e-003	0.5320	1.8900e-003	0.5339	0.0744	1.8100e-003	0.0762	0.0000	511.0630	511.0630	3.8300e-003	0.0000	511.1589
Worker	0.4338	0.3119	3.1760	0.0119	7.3773	7.9800e-003	7.3853	0.8580	7.3400e-003	0.8654	0.0000	1,078.7100	1,078.7100	0.0224	0.0000	1,079.2688
Total	**0.4818**	**1.4125**	**3.4874**	**0.0203**	**10.8866**	**0.0111**	**10.8977**	**1.2402**	**0.0103**	**1.2505**	**0.0000**	**1,877.9465**	**1,877.9465**	**0.0297**	**0.0000**	**1,878.6900**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0850	1.3120	3.3730	4.9500e-003		0.0127	0.0127		0.0123	0.0123	0.0000	403.9313	403.9313	0.0965	0.0000	406.3431
Total	**0.0850**	**1.3120**	**3.3730**	**4.9500e-003**		**0.0127**	**0.0127**		**0.0123**	**0.0123**	**0.0000**	**403.9313**	**403.9313**	**0.0965**	**0.0000**	**406.3431**

Mitigated Construction Off-Site

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

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Hauling	0.0177	0.4242	0.1189	3.0300e-003	0.3274	1.2100e-003	0.3286	0.0410	1.1600e-003	0.0422	0.0000	288.1735	288.1735	3.5500e-003	0.0000	288.2623
Vendor	0.0304	0.6765	0.1925	5.3800e-003	0.1236	1.8900e-003	0.1255	0.0308	1.8100e-003	0.0326	0.0000	511.0630	511.0630	3.8300e-003	0.0000	511.1589
Worker	0.4338	0.3119	3.1760	0.0119	1.1518	7.9800e-003	1.1597	0.2091	7.3400e-003	0.2164	0.0000	1,078.7100	1,078.7100	0.0224	0.0000	1,079.2688
Total	**0.4818**	**1.4125**	**3.4874**	**0.0203**	**1.6027**	**0.0111**	**1.6138**	**0.2809**	**0.0103**	**0.2912**	**0.0000**	**1,877.9465**	**1,877.9465**	**0.0297**	**0.0000**	**1,878.6900**

3.4 Installation of Inverters, transformers, etc - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0672	0.6666	0.6120	9.5000e-004		0.0385	0.0385		0.0354	0.0354	0.0000	83.7171	83.7171	0.0271	0.0000	84.3940
Total	**0.0672**	**0.6666**	**0.6120**	**9.5000e-004**		**0.0385**	**0.0385**		**0.0354**	**0.0354**	**0.0000**	**83.7171**	**83.7171**	**0.0271**	**0.0000**	**84.3940**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0000e-004	5.0800e-003	5.6000e-004	1.0000e-005	0.1916	0.0000	0.1916	0.0191	0.0000	0.0191	0.0000	1.1374	1.1374	1.3000e-004	0.0000	1.1407
Vendor	2.9600e-003	0.0702	0.0191	5.1000e-004	0.0728	1.8000e-004	0.0730	9.2600e-003	1.7000e-004	9.4300e-003	0.0000	48.7983	48.7983	5.0000e-004	0.0000	48.8109
Worker	0.0347	0.0249	0.2538	9.5000e-004	0.5895	6.4000e-004	0.5901	0.0686	5.9000e-004	0.0691	0.0000	86.1923	86.1923	1.7900e-003	0.0000	86.2370
Total	**0.0377**	**0.1002**	**0.2734**	**1.4700e-003**	**0.8539**	**8.2000e-004**	**0.8547**	**0.0970**	**7.6000e-004**	**0.0977**	**0.0000**	**136.1280**	**136.1280**	**2.4200e-003**	**0.0000**	**136.1886**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0267	0.2544	0.6480	9.5000e-004		0.0106	0.0106		9.8600e-003	9.8600e-003	0.0000	83.7170	83.7170	0.0271	0.0000	84.3939
Total	**0.0267**	**0.2544**	**0.6480**	**9.5000e-004**		**0.0106**	**0.0106**		**9.8600e-003**	**9.8600e-003**	**0.0000**	**83.7170**	**83.7170**	**0.0271**	**0.0000**	**84.3939**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0000e-004	5.0800e-003	5.6000e-004	1.0000e-005	0.0185	0.0000	0.0185	1.8500e-003	0.0000	1.8500e-003	0.0000	1.1374	1.1374	1.3000e-004	0.0000	1.1407
Vendor	2.9600e-003	0.0702	0.0191	5.1000e-004	0.0138	1.8000e-004	0.0140	3.1200e-003	1.7000e-004	3.2900e-003	0.0000	48.7983	48.7983	5.0000e-004	0.0000	48.8109
Worker	0.0347	0.0249	0.2538	9.5000e-004	0.0920	6.4000e-004	0.0927	0.0167	5.9000e-004	0.0173	0.0000	86.1923	86.1923	1.7900e-003	0.0000	86.2370
Total	**0.0377**	**0.1002**	**0.2734**	**1.4700e-003**	**0.1244**	**8.2000e-004**	**0.1252**	**0.0217**	**7.6000e-004**	**0.0224**	**0.0000**	**136.1280**	**136.1280**	**2.4200e-003**	**0.0000**	**136.1886**

3.5 Installation of Energy Storage System - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0592	0.5777	0.4965	7.9000e-004		0.0345	0.0345		0.0317	0.0317	0.0000	69.4391	69.4391	0.0225	0.0000	70.0005
Total	**0.0592**	**0.5777**	**0.4965**	**7.9000e-004**		**0.0345**	**0.0345**		**0.0317**	**0.0317**	**0.0000**	**69.4391**	**69.4391**	**0.0225**	**0.0000**	**70.0005**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0104	0.2391	0.0702	1.8000e-003	1.4551	7.3000e-004	1.4559	0.1503	6.9000e-004	0.1510	0.0000	170.9503	170.9503	1.6600e-003	0.0000	170.9919
Vendor	8.6000e-004	0.0215	5.5700e-003	1.4000e-004	0.0327	5.0000e-005	0.0328	3.8200e-003	5.0000e-005	3.8700e-003	0.0000	13.7426	13.7426	1.9000e-004	0.0000	13.7473
Worker	0.0614	0.0442	0.4499	1.6900e-003	1.0450	1.1300e-003	1.0461	0.1215	1.0400e-003	0.1226	0.0000	152.7955	152.7955	3.1700e-003	0.0000	152.8746
Total	**0.0727**	**0.3048**	**0.5256**	**3.6300e-003**	**2.5329**	**1.9100e-003**	**2.5348**	**0.2757**	**1.7800e-003**	**0.2775**	**0.0000**	**337.4884**	**337.4884**	**5.0200e-003**	**0.0000**	**337.6138**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0180	0.1504	0.5331	7.9000e-004		6.4600e-003	6.4600e-003		6.0300e-003	6.0300e-003	0.0000	69.4390	69.4390	0.0225	0.0000	70.0004

Total	0.0180	0.1504	0.5331	7.9000e-004		6.4600e-003	6.4600e-003		6.0300e-003	6.0300e-003	0.0000	69.4390	69.4390	0.0225	0.0000	70.0004

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0104	0.2391	0.0702	1.8000e-003	0.1593	7.3000e-004	0.1600	0.0202	6.9000e-004	0.0209	0.0000	170.9503	170.9503	1.6600e-003	0.0000	170.9919
Vendor	8.6000e-004	0.0215	5.5700e-003	1.4000e-004	5.0400e-003	5.0000e-005	5.0900e-003	9.8000e-004	5.0000e-005	1.0300e-003	0.0000	13.7426	13.7426	1.9000e-004	0.0000	13.7473
Worker	0.0614	0.0442	0.4499	1.6900e-003	0.1631	1.1300e-003	0.1643	0.0296	1.0400e-003	0.0307	0.0000	152.7955	152.7955	3.1700e-003	0.0000	152.8746
Total	**0.0727**	**0.3048**	**0.5256**	**3.6300e-003**	**0.3274**	**1.9100e-003**	**0.3294**	**0.0508**	**1.7800e-003**	**0.0525**	**0.0000**	**337.4884**	**337.4884**	**5.0200e-003**	**0.0000**	**337.6138**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0117	0.1094	0.1979	1.1400e-003	0.8256	7.0000e-004	0.8263	0.0854	6.6000e-004	0.0861	0.0000	105.6620	105.6620	3.0000e-003	0.0000	105.7371
Unmitigated	0.0117	0.1094	0.1979	1.1400e-003	0.8256	7.0000e-004	0.8263	0.0854	6.6000e-004	0.0861	0.0000	105.6620	105.6620	3.0000e-003	0.0000	105.7371

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	14.54	14.54	14.54	216,624	216,624
Total	14.54	14.54	14.54	216,624	216,624

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	40.93	40.93	40.93	100.00	0.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Industrial	0.517262	0.031316	0.171418	0.114437	0.017015	0.004840	0.021467	0.112166	0.001792	0.001507	0.005146	0.000939	0.000694

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

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

NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

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

Mitigated

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

5.3 Energy by Land Use - Electricity

Unmitigated

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

Mitigated

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

6.0 Area Detail

6.1 Mitigation Measures Area

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Unmitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005

6.2 Area by SubCategory

Unmitigated

SubCategory	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

Mitigated

SubCategory	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

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

7.2 Water by Land Use

Unmitigated

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

Mitigated

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

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

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

8.2 Waste by Land Use

Unmitigated

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

Mitigated

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

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Generator Sets	2	3.00	40	84	0.74	Diesel
Pumps	1	2.00	40	84	0.74	Diesel
Skid Steer Loaders	2	6.00	40	65	0.37	Diesel
Tractors/Loaders/Backhoes	1	3.00	40	97	0.37	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	tons/yr										MT/yr					
Generator Sets	4.5900e-003	0.0407	0.0550	1.0000e-004		1.9200e-003	1.9200e-003		1.9200e-003	1.9200e-003	0.0000	8.4781	8.4781	3.7000e-004	0.0000	8.4874
Pumps	1.6400e-003	0.0138	0.0186	3.0000e-005		6.7000e-004	6.7000e-004		6.7000e-004	6.7000e-004	0.0000	2.8260	2.8260	1.3000e-004	0.0000	2.8293
Skid Steer Loaders	1.9500e-003	0.0259	0.0416	6.0000e-005		8.8000e-004	8.8000e-004		8.1000e-004	8.1000e-004	0.0000	5.4563	5.4563	1.7600e-003	0.0000	5.5005
Tractors/Loaders/ Backhoes	1.1400e-003	0.0115	0.0167	2.0000e-005		5.7000e-004	5.7000e-004		5.2000e-004	5.2000e-004	0.0000	2.0519	2.0519	6.6000e-004	0.0000	2.0685
Total	**9.3200e-003**	**0.0920**	**0.1320**	**2.1000e-004**		**4.0400e-003**	**4.0400e-003**		**3.9200e-003**	**3.9200e-003**	**0.0000**	**18.8124**	**18.8124**	**2.9200e-003**	**0.0000**	**18.8857**

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

APPENDIX B

Biological Assessment

Prepared by

Live Oak Associates

December 2020

LIVE OAK ASSOCIATES, INC.

an Ecological Consulting Firm

GRAPE SOLAR PROJECT
BIOLOGICAL ASSESSMENT
KINGS COUNTY, CALIFORNIA

Prepared by

LIVE OAK ASSOCIATES, INC.

Rick Hopkins, Principal and Senior Conservation Biologist/Ecologist
Katrina Krakow, M.S., Project Manager and Staff Ecologist
Geoff Cline, Senior Project Manager/Senior Ecologist

Prepared for

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Environmental Consulting Service
11942 Red Hill Avenue
Santa Ana, CA 92705

December 30, 2020 PN 2435-01

EXECUTIVE SUMMARY

Live Oak Associates, Inc., (LOA) conducted an investigation of the biological resources of the Grape Solar project site ("Project Site", "Site") in Kings County, California.

LOA evaluated likely impacts to biological resources resulting from development of an approximately 1,759-acre photo-voltaic solar energy project on the Grape Solar site. The Project Site is located in west-central Kings County to the northwest of State Route 41, north of Nevada Avenue, approximately one-half mile west of SR-41. The southern site boundary fronts onto Nevada Avenue for a distance of two miles, and the 25th Avenue alignment bisects the site from north to south. The project site includes Assessor's Parcel Nos. 026-320-010, -011, -021, -022, 023, -024, -025, -026, -027, -028; and 026-330-032, -035, -037, -055, -057. On January 22, 2020, Live Oak Associates (LOA) conducted a site visit to assess for biotic habitats, the plants and animals occurring in those habitats, and significant habitat values that may be protected by state and federal law.

The approximately 1,759-acre Project Site consists of agricultural lands within a region dominated by similar agricultural lands. Several agricultural canals run through and along the site. The Empire Westside Main Canal runs north-south nearly adjacent to the eastern portion of the project site and another large canal runs in a north-south direction along the 25th Avenue alignment. Smaller irrigation canals and ditches run through the project site in a north-south direction. There are no buildings, sheds or other structures on the Grape Solar project site. Development of the project site would not significantly impact habitat for special status species, and potential impacts are limited to individual special status species. The Project Site does not provide suitable habitat for locally occurring special-status plant or animal species except for burrowing owls and foraging habitat for Swainson's hawks. However, a number of special status animal species may occur onsite. Suitable habitat was found for fourteen special status animal species that potentially occur as regular foragers or residents of the Project Site. These include the western snowy plover, mountain plover, white-faced ibis, Swainson's hawk, northern harrier, white-tailed kite, western burrowing owl, long-eared owl, loggerhead shrike, yellow-headed blackbird, tricolored blackbird, Townsend's big-eared bat, pallid bat, and California mastiff bat. Additional impacts to Swainson's hawks will be mitigated through avoidance of active nests found during required preconstruction surveys; and if active nests are found onsite or on adjacent lands, additional mitigation for loss of habitat may be required. Similar avoidance and preconstruction surveys will reduce impacts to burrowing owls, raptors, loggerhead shrike, tricolored blackbird, and other nesting birds protected by the federal Migratory Bird Treaty Act. While there are no reported sightings of San Joaquin kit fox or American badgers within or near the Project Site, and no evidence of kit fox or badger was found during LOA's field surveys, impacts to kit fox and badger are potentially significant. Prior to the construction of the solar development, preconstruction surveys will be conducted. Preconstruction surveys and avoidance measures will reduce impacts to kit fox and badgers from direct construction related mortality to a less-than-significant level. Impacts to wildlife movements and movement corridors will be minimized through the planned retention of canals as well as the construction of wildlife-friendly fencing. Waters of the U.S. are absent from the Project Site.

TABLE OF CONTENTS

1 INTRODUCTION

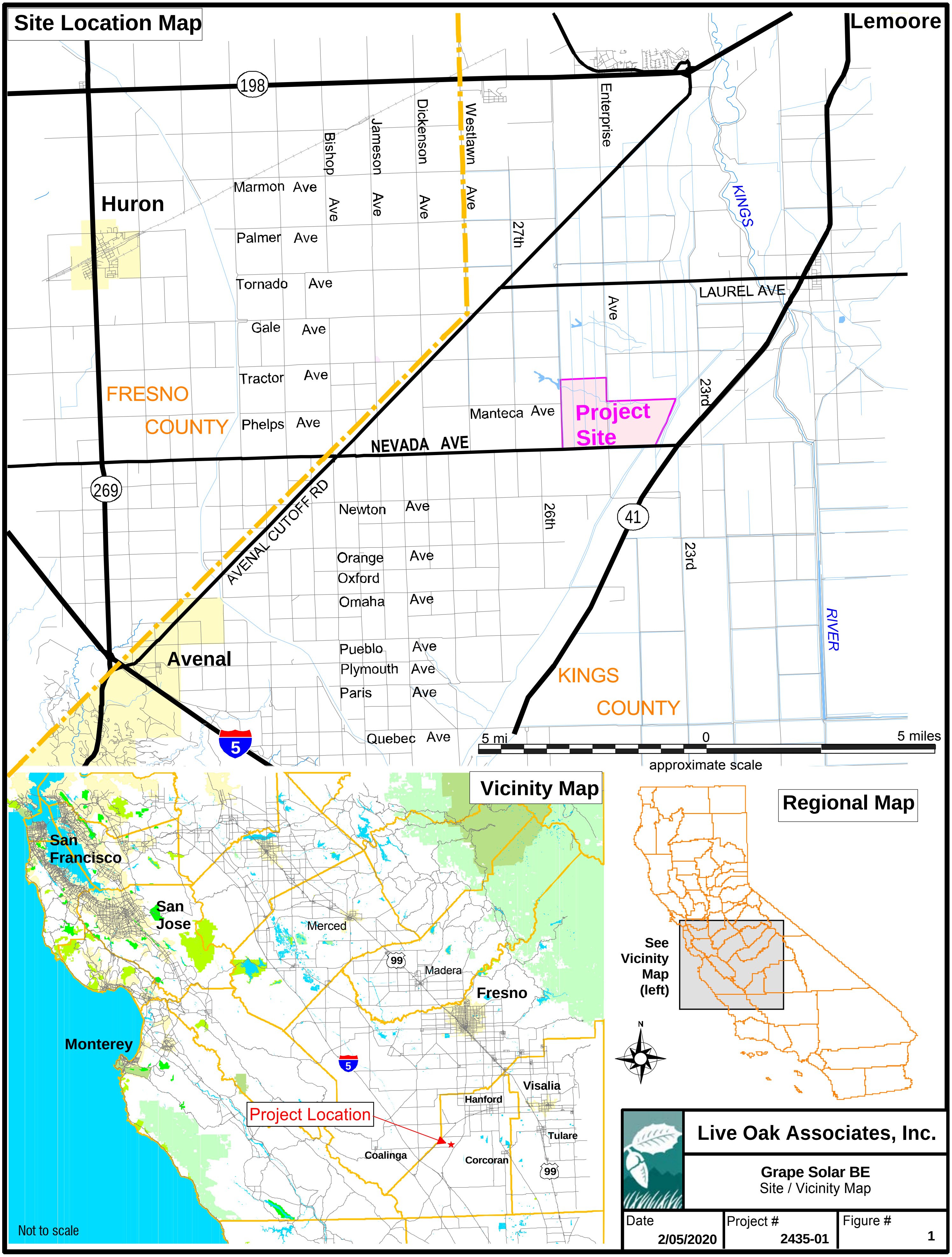
Live Oak Associates, Inc. (LOA) has prepared the following report. This report describes the biotic resources of the proposed approximately 1,759-acre Grape Solar project site ("Project Site, site") evaluates likely impacts to biological resources resulting from the construction of this projects.

The Grape Solar Project Site is located to the northwest of State Route 41, north of Nevada Avenue, approximately one-half mile west of SR-41. The southern site boundary fronts onto Nevada Avenue for a distance of two miles, and the 25th Avenue alignment bisects the site from north to south (Figure 1). The project site includes Assessor's Parcel Nos. 026-320-010, -011, -021, -022, 023, -024, -025, -026, -027, -028; and 026-330-032, -035, -037, -055, -057. None of the project parcels are under Land Conservation Contract or Farmland Security Zone Contract under the Williamson Act. The Project Site is located within the Westhaven U.S. Geological Survey (USGS) 7.5-minute quadrangle.

The Grape Solar Project site is virtually level with elevations ranging from a high of 224 feet above mean sea level (amsl) at the northwest corner of the site to a low of 194 feet amsl at the southeast corner. The only improved County road providing direct access to the site is Nevada Avenue which runs along the southern boundary of the site for a distance of two miles. Most of the site is currently used for the cultivation of winter wheat during the wet season and is typically left fallow during the dry season. The 70-kV Henrietta to Tulare Lake sub-transmission line runs through the middle of the site from north to south along the 25th Avenue alignment. Several agricultural canals run through the site. A large canal runs in a north-south direction along the east side of the 25th Avenue alignment, and another large canal runs parallel to the east site boundary at a distance of 200-300 feet east of the site. Smaller irrigation canals and ditches run through and alongside the project site in a north-south direction. There are no buildings, sheds, wells, or other structures on the Grape Solar Project site.

1.1 PROJECT DESCRIPTION

The Grape Solar Project is planned to generate at total of 250 MW (AC) of electrical output from solar photovoltaic (PV) modules. The project is planned to be constructed over an 18-month period commencing in mid-2022, with completion scheduled for mid-2023.


Site Location Map
Lemoore
198
Bishop Ave
Jameson Ave
Dickenson Ave
Westlawn Ave
Enterprise
Huron
Marmon Ave
Palmer Ave
Tornado Ave
Gale Ave
Tractor Ave
Phelps Ave
27th
KINGS
LAUREL AVE
Ave
FRESNO COUNTY
Manteca Ave
Project Site
23rd
NEVADA AVE
269
AVENAL CUTOFF RD
Newton Ave
26th
41
Orange Ave
Oxford
Omaha Ave
23rd
RIVER
Avenal
Pueblo Ave
Plymouth Ave
Paris Ave
KINGS COUNTY
5
Quebec Ave
5 mi
0
5 miles
approximate scale
Vicinity Map
San Francisco
San Jose
Merced
99
Madera
Fresno
Monterey
5
Visalia
Hanford
Project Location
Tulare
Coalinga
Corcoran
99
Not to scale
Regional Map
See Vicinity Map (left)
N
Live Oak Associates, Inc.
Grape Solar BE
Site / Vicinity Map
Date 2/05/2020
Project # 2435-01
Figure # 1

The solar modules will be mounted on a series of horizontal single-axis trackers which will be oriented north-south and rotate the solar arrays in an east-west direction. The solar modules produce direct current (DC) power and the electricity travels to power conversion stations (PCS) via underground cables to be converted to alternating current (AC) power. The project will include a total of 100 PCSs with power rating of 2.5 MW each, which will step up the generated power to a collection voltage of 34.5-kV.

The Grape Solar Project will include an electrical substation, a battery storage facility, and an Operations and Maintenance (O&M) facility, all of which will be located together within a 10-acre area near the southern border of the project site, just northeast of the intersection of Nevada Avenue and the 25th Avenue alignment. The on-site substation will step up the generated power from 34.5-kV collection voltage to 230-kV for transmission.

The battery storage facility will provide up to 400 MW hours of storage which will be used to optimize power delivery to the grid, by storing excess generation during low demand periods, and supplying power to the grid when demand is high.

The power generated at the Grape Solar facility will be conveyed to a new 230-kV gen-tie line that will connect the project to the Point of Interconnection (POI) with the PG&E system at the Gates Substation. The new gen-tie line will follow Nevada Avenue for a distance of 6.2 miles to the Fresno County line just west of Avenal Cutoff Road. An additional 6.3 miles of gen-tie line will continue along Jayne Avenue in Fresno County to the Gates Substation. The Kings County portion of the Gen-Tie Line was approved by Kings County together with the Aquamarine Solar Project located one mile north of the Grape Solar Project site. The Fresno County segment of the Gen-Tie Line was approved by a separate Conditional Use Permit from the County of Fresno.

1.2 REPORT OBJECTIVES

The development of land can damage or modify biotic habitats used by sensitive plant and wildlife species. In such cases, site development may be regulated by state or federal agencies, subject to provisions of the California Environmental Quality Act (CEQA), and/or covered by policies and ordinances of Kings County. This report addresses issues related to: 1) sensitive biotic resources occurring within the Grape Solar Project Site; 2) the federal, state, and local laws regulating such resources, and 3) mitigation measures which may be required to reduce the magnitude of anticipated impacts and/or comply with permit requirements of state and federal resource agencies, and the requirements of the California Environmental Quality Act (CEQA). As such, the objectives of this report are to:

- Summarize all site-specific information related to existing biological resources, based on a review of the literature, a search of species databases, and field surveys conducted by LOA over the entire Project Site;

- In addition to species observed to be present within the Project Site, make reasonable inferences about the other biological resources that could occur onsite based on habitat suitability and the proximity of the Project Site to a species' known range;

- Summarize all state and federal natural resource protection laws that may be relevant to development of Solar project within the Project Site;

- Identify and discuss project impacts to biological resources likely to occur within the Project Site within the context of CEQA or any state or federal laws; and

- Identify avoidance and mitigation measures that would reduce impacts to a less-than-significant impact (as identified by CEQA) and are generally consistent with recommendations of the resource agencies for affected biological resources.

1.3 STUDY METHODOLOGY

The analysis of impacts, as discussed in Section 3.0 of this report, was based on the known and potential biotic resources of the study area discussed in Section 2.0. Sources of information used in the preparation of this analysis included: 1) the *California Natural Diversity Data Base* (CDFW 2020); 2) the *Online Inventory of Rare and Endangered Vascular Plants of California* (CNPS 2020); 3) manuals and references related to plants and animals of the San Joaquin Valley region. Field survey of the Project Site was conducted on January 22, 2020 by LOA ecologist Katrina Krakow. During this site visit, the principal land uses of the site were identified and the constituent plants and animals were noted.

Detailed surveys for sensitive biological resources were not conducted during the site visit, however a Swainson's hawk nest survey was conducted for the larger Westlands Solar Park study area on April 27 and May 3 and 4, 2012 which included the Project Site within the larger Wetlands Solar

Park study area, and a 10-mile buffer of the Westlands Solar Park study area, with nest sites being revisited in 2017 and 2018 (Appendix C).

It is noted that this Biological Assessment was prepared for the Mitigated Negative Declaration (MND) on the Grape Solar project. The potential biological impacts associated with this solar development construction were previously addressed in the Westlands Solar Park Master Plan and Gen-Tie Corridors Program EIR, which was certified by the Westlands Water District (WWD) Board of Directors on January 16, 2018. The Program EIR (PEIR) provides plan-level environmental review for the Grape Solar project. As such, the MND (and this biological report) constitute second tier environmental documents under CEQA. As provided in the CEQA Guidelines, the previous biological report and analysis prepared for the PEIR are hereby incorporated by reference into this project-specific biological report on the Grape Solar project. The PEIR can be accessed with the following web link:

https://wwd.ca.gov/news-and-reports/environmental-docs/

2 EXISTING CONDITIONS

2.1 REGIONAL SETTING

Like most of California, the Central San Joaquin Valley (and the Project Site) experiences a Mediterranean climate. Warm dry summers are followed by cool moist winters. Summer temperatures commonly exceed 90 degrees Fahrenheit, and the relative humidity is generally very low. Winter temperatures rarely rise much above 70 degrees Fahrenheit, with daytime highs often below 60 degrees Fahrenheit. Annual precipitation within the Project Site is about 10 inches, almost 85% of which falls between the months of October and March. Nearly all precipitation falls in the form of rain.

The Kings County area of the Central San Joaquin Valley receives water from the Kings River, which is located approximately 1.5 miles east of the Project Site. The Kings River historically drained into the Tulare Lake Basin which contained the vast Tulare Lake, which encompassed a large area of Kings County and at times extended to the eastern edge of the Project Site. The Kings River and Tulare Lake contained large areas of riparian, wetland, and aquatic ecosystems that supported large populations of diverse native plants and animals. Under present conditions, the Kings River supports only a fraction of the riparian habitat it once supported and the aquatic habitat has been greatly degraded from agricultural runoff and irregular flows. In essence, the river currently provides water to a series of distributary channels supplying water to farmland in the region. Tulare Lake has long been drained and converted to farmland and urban uses.

Native upland biotic habitats of the Central San Joaquin Valley once consisted of grassland and shrubland, nearly all of which have been converted to farmland or urban use within the last 50 years or more. Native plant and animal species once abundant in the valley have become locally extirpated or have experienced large reductions in their populations. The native habitat that remains in the region is particularly valuable to native wildlife species including special status species that still persist in the region.

The lands surrounding the Project Site consist of agricultural land. The nearest natural habitats to the Project Site are the Kettleman Hills approximately 10 miles to the southwest and the Kings River drainage approximately 1.5 miles to the east of the Project Site.

2.2 PROJECT SITE

The approximately 1,759-acre Grape Solar Project site located to the northwest of State Route 41, north of Nevada Avenue, approximately one-half mile west of SR-41. The southern site boundary fronts onto Nevada Avenue for a distance of two miles, and the 25th Avenue alignment bisects the site from north to south. The Grape Solar project site is virtually level with elevations ranging from a high of 224 feet above mean sea level (amsl) at the northwest corner of the site to a low of 194 feet amsl at the southeast corner. The project site is located in the Westhaven U.S. Geological Survey (USGS) quadrangle. Most of the site is currently used for the cultivation of winter wheat during the wet season and is typically left fallow during the dry season. Five agricultural canals run through and along the site. The Empire Westside Main Canal runs north-south along the eastern portion of the project site, and another large canal runs in a north-south direction along the western portion of the project site, and three smaller irrigation canals and ditches run through the project site in a north-south direction.

The Grape Solar Project is planned to generate at total of 250 MW (AC) of electrical output from solar photovoltaic (PV) modules. The project is planned to be constructed over an 18-month period commencing in early 2021, with completion scheduled for late 2022.

Five soil types: 1) Houser clay, partially drained, 2) Lethent clay loam, 3) Twisselman silty clay, saline-alkali, and 4) Westcamp Loam, partially drained were identified on the Grape Solar site (NRCS Web Soil Survey 2020). All soil types are considered hydric except Twisselman silty clay, saline-alkali, which is predominantly non-hydric. Hydric soils are soils are defined as saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions such that under sufficiently wet conditions they support hydrophytic vegetation. Due to ongoing agricultural disturbance; however, no hydric vegetation was observed on the site except within canals, which the project will avoid.

2.3 BIOTIC HABITATS/LAND USES

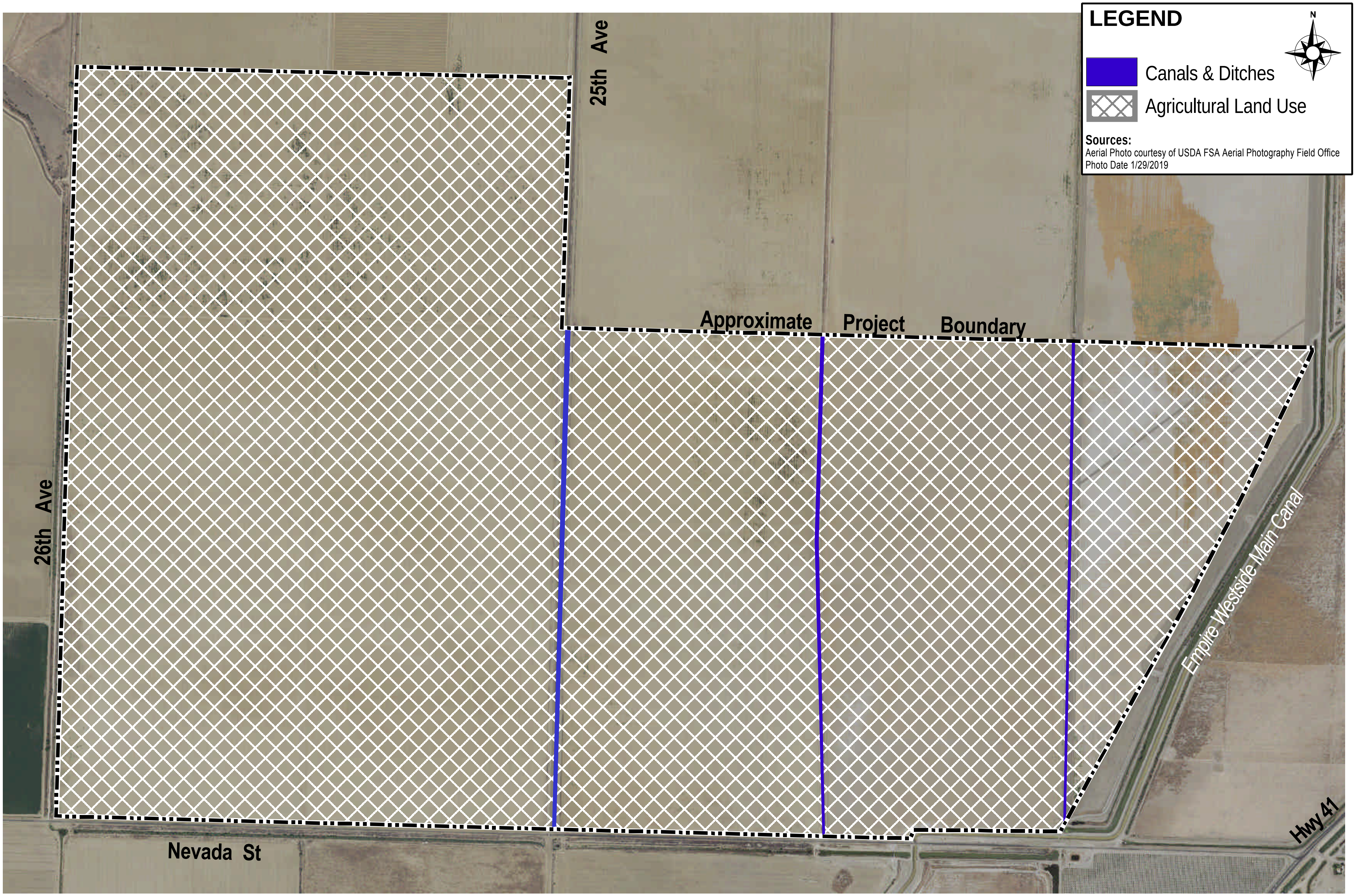
The entire Grape Solar Project Site consists of agricultural lands with canals running through them (Figure 2). A list of the terrestrial vertebrates observed to be using, or potentially using, the habitats of the site is provided in Appendix A.

2.3.1 Agricultural

Regular agricultural activities on the site create unsuitable habitat for most native amphibian, reptile, bird, and mammal species. Nonetheless, a number of animal species are expected to use the agricultural fields, especially in times where disking is not recent. The majority of the site supports winter wheat or fallowed fields. Five canals occur within and along the agricultural areas of the site in a north-south direction, including a moderately-sized canal along 25th Avenue, and large canals nearly adjacent to the site to the east (Empire Westside Main Canal) and west as well as a large off-site canal 2 miles north of the project site south of Laurel Avenue; these large canals provide the best habitat for burrowing owls in the local vicinity. Onsite canals are fairly small with the exception of the canal adjacent to the unimproved 25th Avenue alignment, which runs through the central portion of the site. These canals support water and hydric species such as cattail (*Typha sp.*), cottonwood (*Populus* sp.), willow (*Salix* sp.), and tamarisk (*Tamarix* sp.).

Pacific chorus frogs (*Pseudacris regilla*) and western toads (*Bufo boreas*) may use the irrigation canals for breeding and may also disperse through the adjacent fields during the winter and spring or when the fields are not regularly disked. Reptile species that may forage in this habitat include lizards such as the side-blotched lizard (*Uta stansburiana*) and western whiptail (*Cnemidophorus tigris*), and snakes such as the gopher snake (*Pituophis melanoleucus*), common kingsnake (*Lampropeltis getulus*), coachwhip (*Masticophus flagellum*), and glossy snake (*Arizona elegans*).

Resident bird species expected to use this habitat would include Brewer's blackbirds (*Euphagus cyanocephalus*), brown-headed cowbirds (*Molothrus ater*), and European starlings (*Sturnus vulgaris*), among others. Wintering birds that may utilize the disked fallow fields would be the savannah sparrow (*Passerella sandwichensis*), American pipit (*Anthus rubescens*), and Say's phoebe (*Sayornis saya*), among others. Summer migrants such as the barn swallow (*Hirundo rustica*) may forage on the site.



Live Oak Associates, Inc.

Grape Solar BE
Biotic Habitats

Date	Project #	Figure #
2/05/2020	2435-01	2

Burrowing rodent activity in the fields is expected to be minimal due to the ground disturbance regime. Botta's pocket gopher (*Thomomys bottae*) burrows occur within the site, and California ground squirrel (*Otospermophilus beecheyi*) burrows occur along the agricultural field perimeters.

The site offers limited foraging opportunities for mammalian and avian predators. Raptors such as red-tailed hawks (*Buteo jamaicensis*), Swainson's hawks (*Buteo swainsoni*), great horned owls (*Bubo virginianus*), burrowing owls (*Athene cunicularia*), and barn owls (*Tyto alba*) may forage on the site, and burrowing owls are known to breed in the local vicinity, including the canal south of Laurel Avenue located 2 miles to the north. Disturbance-tolerant mammalian predators such as raccoons (*Procyon lotor*), striped skunks (*Mephitis mephitis*), coyotes (*Canis latrans*), and red foxes (*Vulpes vulpes*) may occasionally forage on or pass through the site.

2.4 WILDLIFE MOVEMENT CORRIDORS

Wildlife movement corridors are areas where regional wildlife populations regularly and predictably move during dispersal or migration. Movement corridors in California are typically associated with valleys, rivers and creeks supporting riparian vegetation, and ridgelines. In the San Joaquin Valley, which lacks many of the more pronounced topographic features found in the surrounding foothills, wildlife will often move across ill-defined undeveloped habitat patches, or regional movement is facilitated along existing linear features such as ditches, canals, farm roads, and creeks. In areas of intense farming, these existing linear features tend to be used disproportionately for movement when compared to the adjacent, intensely farmed lands. While actively farmed fields are not barriers in themselves, they are used less often than the linear features that cut through them.

The intense farming throughout the San Joaquin Valley over the last century has long altered the more traditional regional movement patterns of wildlife. While regionally-occurring wildlife do, in fact, move across the broad range of the Valley, they do so less effectively than they once did, relying more extensively on various linear features such as canals, ditches and creeks. Regionally, the nearest areas believed to provide for regional wildlife movement include areas in the surrounding Sierra and inner coast range foothills that have not been substantially altered.

The Project Site consists of agricultural fields adjacent to canal habitat. Canals within and adjacent to the Project Site can function as movement corridors for the regular home range or dispersal movements of native wildlife, including special status species. The USFWS' *Recovery Plan for*

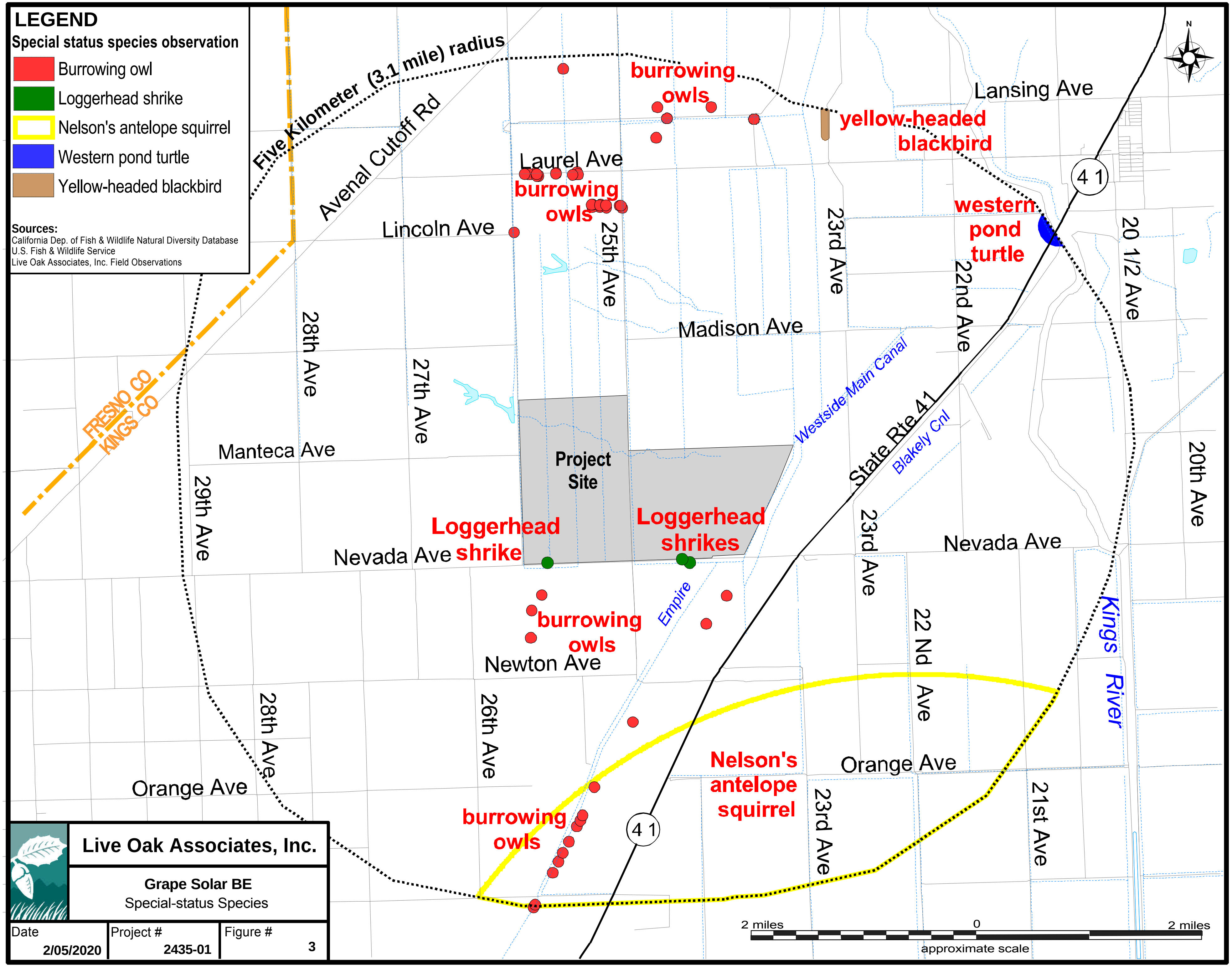
Upland Species of the San Joaquin Valley (Recovery Plan) does not show movement corridors within or near the Project Site. The Recovery Plan shows the foothills to the west as a north-south movement corridor (USFWS 1998). The nearest significant riparian corridor that likely facilitates regional movement of wildlife is the Kings River to the northeast of the site. This riparian area is located approximately 1.5 miles to the east of the Project Site at its nearest point.

2.5 SPECIAL STATUS PLANTS AND ANIMALS

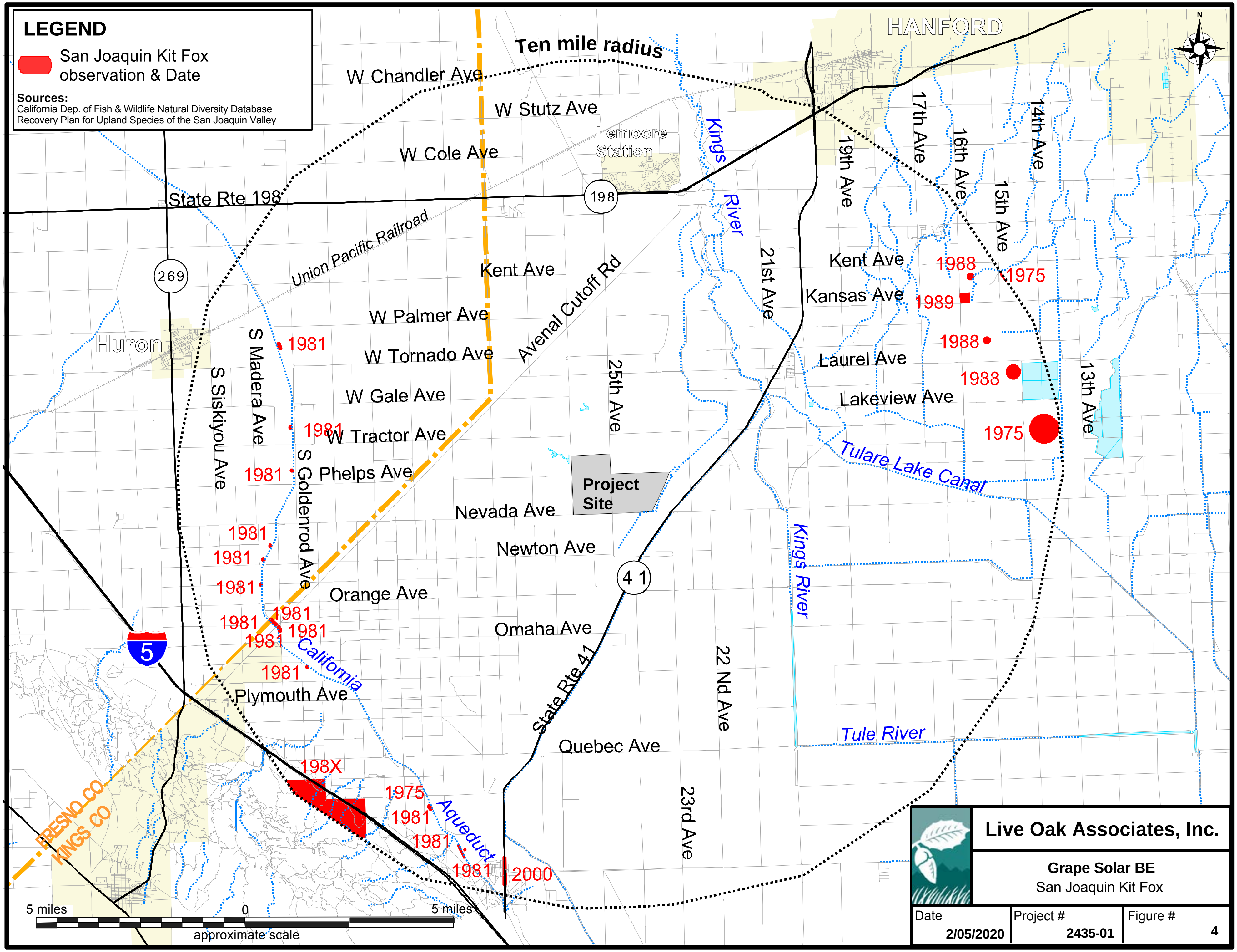
Several species of plants and animals within the state of California have low populations and/or limited distributions. Such species may be considered "rare" and are vulnerable to extirpation as the state's human population grows and the habitats these species occupy are converted to agricultural and urban uses. As described more fully in Section 3.2, state and federal laws have provided the California Department of Fish and Wildlife (CDFW) and the U.S. Fish and Wildlife Service (USFWS) with a mechanism for conserving and protecting the diversity of plant and animal species native to the state. A sizable number of native plants and animals have been formally designated as "threatened" or "endangered" under state and federal endangered species legislation. Others have been designated as candidates for such listing. Still others have been designated as "species of special concern" by the CDFW. The California Native Plant Society (CNPS) has developed its own set of lists of native plants considered rare, threatened, or endangered (CNPS 2020). Collectively, these plants and animals are referred to as "special status species".

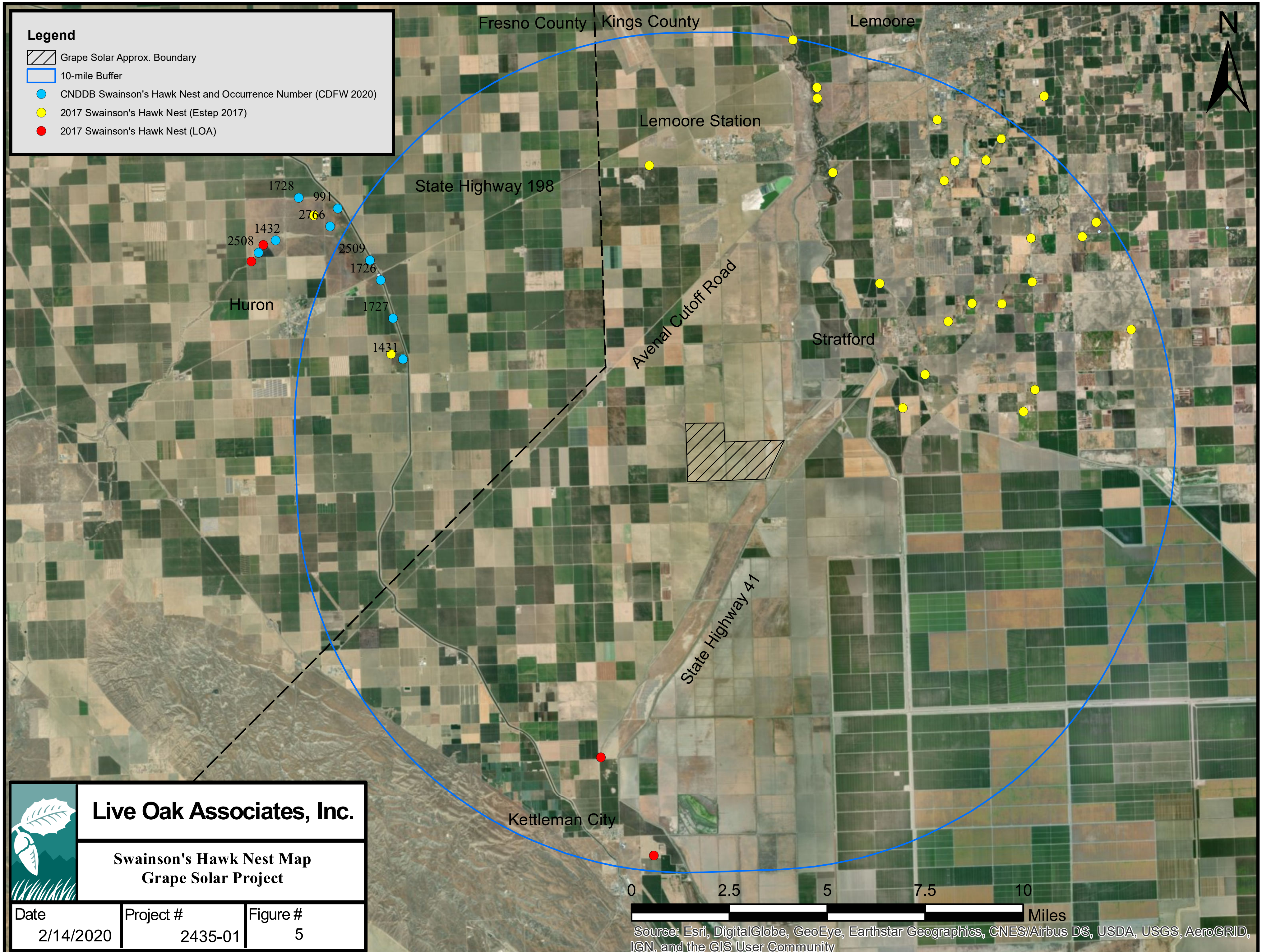
A number of special status plants and animals occur in the vicinity of the Project Site (Figures 3, 4, and 5). These species, and their potential to occur in the Project Site, are listed in Table 2 in the following pages. Sources of information for this table included *California Natural Diversity Data Base* (CNDDB) (CDFW 2020), *Listed Plants* and *Listed Animals* (USFWS 2020), *State and Federally Listed Endangered and Threatened Animals of California* (CDFW 2020), *The California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California* (CNPS 2020), *California Bird Species of Special Concern* (Shuford and Gardall 2008), and *California Amphibian and Reptile Species of Special Concern* (Thompson et al. 2016). This information was used to evaluate the potential for special status plant and animal species to occur within the Project Site. It is important to note that the California Natural Diversity Data Base (CNDDB) is a volunteer database.

A search of published accounts for all of the relevant special status plant and animal species was conducted for the Westhaven USGS 7.5-minute quadrangle within which the Project Site is located, and for the eight surrounding quadrangles (Calflax, Vanguard, Lemoore, Huron, Stratford, La Cima, Kettleman City, and Stratford SE) using the California Natural Diversity Data Base Rarefind 5 (2020).



LEGEND
Special status species observation
Burrowing owl
Loggerhead shrike
Nelson's antelope squirrel
Western pond turtle
Yellow-headed blackbird
Sources:
California Dep. of Fish & Wildlife Natural Diversity Database
U.S. Fish & Wildlife Service
Live Oak Associates, Inc. Field Observations
Five Kilometer (3.1 mile) radius
Avenal Cutoff Rd
Laurel Ave
Lincoln Ave
Lansing Ave
Madison Ave
Manteca Ave
Nevada Ave
Newton Ave
Orange Ave
28th Ave
27th Ave
29th Ave
26th Ave
25th Ave
23rd Ave
22nd Ave
22 Nd Ave
21st Ave
20 1/2 Ave
20th Ave
State Rte 41
41
Westside Main Canal
Blakely Cnl
Empire
Kings River
FRESNO CO
KINGS CO
burrowing owls
yellow-headed blackbird
western pond turtle
Project Site
Loggerhead shrike
Loggerhead shrikes
Nelson's antelope squirrel
2 miles
0
approximate scale
N
Live Oak Associates, Inc.
Grape Solar BE
Special-status Species
Date
2/05/2020
Project #
2435-01
Figure #
3


LEGEND
San Joaquin Kit Fox observation & Date
Sources:
California Dep. of Fish & Wildlife Natural Diversity Database
Recovery Plan for Upland Species of the San Joaquin Valley
Ten mile radius
HANFORD
Lemoore Station
Huron
W Chandler Ave
W Stutz Ave
W Cole Ave
State Rte 198
198
269
Union Pacific Railroad
Kent Ave
W Palmer Ave
W Tornado Ave
W Gale Ave
W Tractor Ave
S Phelps Ave
S Goldenrod Ave
S Madera Ave
S Siskiyou Ave
Avenal Cutoff Rd
Nevada Ave
Newton Ave
Orange Ave
Omaha Ave
Plymouth Ave
Quebec Ave
State Rte 41
41
5
25th Ave
21st Ave
22 Nd Ave
23rd Ave
19th Ave
17th Ave
16th Ave
15th Ave
14th Ave
13th Ave
Kent Ave
Kansas Ave
Laurel Ave
Lakeview Ave
Kings River
Tulare Lake Canal
Tule River
California Aqueduct
Project Site
FRESNO CO
KINGS CO
1981
1975
1988
1989
198X
2000
5 miles
0
5 miles
approximate scale
Live Oak Associates, Inc.
Grape Solar BE
San Joaquin Kit Fox
Date
2/05/2020
Project #
2435-01
Figure #
4



Live Oak Associates, Inc.		
Swainson's Hawk Nest Map Grape Solar Project		
Date 2/14/2020	Project # 2435-01	Figure # 5

TABLE 2. LIST OF SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE VICINITY OF THE GRAPE SOLAR PROJECT SITE

PLANTS (adapted from CDFW 2020 and CNPS 2020)

Species Listed as Threatened or Endangered under the State and/or Federal Endangered Species Act

Species	Status	Habitat	*Occurrence in the Project Site
California jewelflower (*Caulanthus californicus*)	FE, CE, CRPR 1B.1	Habitat Chenopod scrub, valley and foothill grassland, pinyon-juniper woodland. Elevation: 61-1000 meters. Blooms: February–May.	**Absent.** Suitable habitat for this species is absent from the Project Site. Any suitable habitat that may have once been present has been highly modified for human use.
Kern mallow (*Eremalche parry* ssp.*kernensis*)	FE, CRPR 1B.2	Habitat On dry, open sandy to clay soils; often at edge of balds in Chenopod scrub, Pinyon and juniper woodland, Valley and foothill grassland. Elevation: 70 – 1290 meters. Blooms: January - May.	**Absent.** Suitable habitat for this species is absent from the Project Site. Any suitable habitat that may have once been present has been highly modified for human use.
San Joaquin woolythreads (*Monolopia congdonii*)	FE, CRPR 1B.2	Habitat: Chenopod scrub, valley and foothill grassland. Elevation: 60-800 meters. Blooms: February-May.	**Absent.** Suitable habitat for this species is absent from the Project Site. Any suitable habitat that may have once been present has been highly modified for human use.

ANIMALS (adapted from CDFW 2020 and USFWS 2020)

Species Listed as Threatened or Endangered under the State and/or Federal Endangered Species Act

Species	Status	Habitat	*Occurrence in the Project Site
Vernal pool fairy shrimp (*Branchinecta lynchi*)	FT	Occurs in vernal pools of California.	**Absent.** Suitable habitat in the form of vernal pools is absent from the Project Site.
Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)	FT	Lives in mature elderberry shrubs of California's Central Valley and Sierra Foothills.	**Absent.** Suitable habitat in the form of elderberry shrubs is absent from the Project Site.
California tiger salamander (*Ambystoma californiense*)	FT, CT	Breeds in vernal pools and stock ponds of central California; adults aestivate in grassland habitats adjacent to the breeding sites.	**Absent.** No historic or current records of this species are known within the region. Intensively cultivated lands provide unsuitable habitat for this species.
Giant garter snake (*Thamnophis gigas*)	FT, CT	Habitat requirements consist of (1) adequate water during the snake's active season (early-spring through mid-fall) to provide food and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat during the active season; (3) grassy banks and openings in waterside vegetation for basking; and (4) higher elevation uplands for cover and refuge from flood waters during the snake's dormant season in the winter.	**Unlikely.** Marginal breeding and overwintering habitat is available along the irrigation canals within the larger canals adjacent to the Project Site to the east and west. The nearest recorded observation is more than 3 miles from the site (CNDDB 2020).

TABLE 2. LIST OF SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE VICINITY OF THE GRAPE SOLAR PROJECT SITE

ANIMALS (Continued)

Species Listed as Threatened or Endangered under the State and/or Federal Endangered Species Act

Species	Status	Habitat	*Occurrence in the Project Site
Blunt-nosed leopard lizard (*Gambelia silus*)	FE, CE, CP	Frequents grasslands, alkali meadows and chenopod scrub of the San Joaquin Valley from Merced south to Kern County.	**Absent.** Habitats required by this species are absent from the project site, and vicinity.
Swainson's hawk (*Buteo swainsoni*)	CT	Breeds in stands with few trees in juniper-sage flats, riparian areas, and in oak savannah. Requires adjacent suitable foraging areas such as grasslands or alfalfa fields supporting rodent populations.	**Present.** Foraging habitat is available throughout the project area. Potential breeding habitat is present at the off-site tailwater pond which is nearly adjacent to the northwestern corner of the site, which is within the typical construction-free buffer required around an active nest. Swainson's hawks were observed flying over the site during the April 10 and May 28, 2018 and April 11, 2019 site visits for other adjacent solar projects; they are known to occur over and near the site, per previous surveys conducted by LOA as well.
Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*)	FC, CE	Breed in large blocks of riparian habitats, particularly cottonwoods and willows.	**Absent.** Dense riparian habitat required by this species is absent from the Project Site.
Western snowy plover (*Charadrius alexandrines nivosus*)	FT, CSC	Uses human-made agricultural wastewater ponds and reservoir margins. Breeds on barren to sparsely vegetated ground at alkaline or saline lakes, reservoirs, ponds, and riverine sand bars.	**Possible.** Breeding and foraging habitat is available along agricultural canals within the Project Site and the canals adjacent to the site to the east and west.
Tricolored Blackbird (*Agelaius tricolor*)	CT, CSC	Breeds near fresh water, primarily emergent wetlands, with tall thickets. Forages in grassland and cropland habitats.	**Possible.** Foraging habitat for this species is present within the Project Site in the form of cattails in the canals of the site, specifically the canal adjacent to 25th Avenue and within off-site canals to the east and west of the site, as well as the canal located 2 miles to the north along Laurel Avenue, however presence of breeding habitat on the site itself would depend on the type of crop planted from season to season. The Grape Solar site has typically been cultivated for winter wheat in the wet season and left fallow during the dry season. Tricolored blackbirds are known to nest in wheat fields.
Nelson's antelope squirrel (*Ammospermophilus nelsoni*)	CT	Frequents open shrublands and annual grassland habitats.	**Absent.** Habitats required by this species are absent from the Project Site and surrounding agricultural lands due to intensive agricultural use.

TABLE 2. LIST OF SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE VICINITY OF THE GRAPE SOLAR PROJECT SITE

ANIMALS (Continued)

Species Listed as Threatened or Endangered under the State and/or Federal Endangered Species Act

Species	Status	Habitat	*Occurrence in the Project Site
Giant kangaroo rat (*Dipodomys ingens*)	FE, CE	Inhabits grasslands on gentle slopes generally less than 10°, with friable, sandy-loam soils.	**Absent**. Habitats required by this species are absent from the Project Site and surrounding agricultural lands due to intensive agricultural use.
Fresno kangaroo rat (*Dipodomys nitratoides exilis*)	FE, CE	Inhabits grassland on gentle slopes generally less than 10°, with friable, sandy-loam soils.	**Absent.** Habitats required by this species are absent from the Project Site and surrounding agricultural lands due to intensive agricultural use.
Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*)	FE, CE	Inhabits arid land with grassland or salt scrub on level or near-level terrain on the San Joaquin Valley floor with alluvial fan and floodplain soils.	**Absent.** Habitats required by this species are absent from the Project site and vicinity.
San Joaquin kit fox (*Vulpes macrotis mutica*)	FE, CT	Frequents desert alkali scrub and annual grasslands and may forage in adjacent agricultural habitats. Utilizes enlarged (4 to 10 inches in diameter) ground squirrel burrows as denning habitat.	**Unlikely.** Some burrows observed in the surrounding area were of suitable size for the kit fox. However, nearly all these burrows were within the vicinity of California ground squirrels or actively used by ground squirrels. The Project Site and the surrounding area have been highly modified for agricultural use and, as a result, provide only marginal foraging and breeding habitat for the kit fox. There are no documented sightings of this species on the Project Site or in the surrounding area, but there have been numerous documented sightings within a ten-mile radius of the Project Site (see Figure 4), between 1975 and 2000 (CNDDB 2020). Therefore, kit foxes are unlikely to breed within the Project Site, but may rarely forage within the Project Site, and may rarely pass through the Project Site for dispersal movements.

ANIMALS (adapted from CDFW 2020 and USFWS 2020)

State Species of Special Concern

Western spadefoot (*Scaphiopus hammondii*)	CSC	Primarily occurs in grasslands, but also occurs in valley and foothill hardwood woodlands. Requires vernal pools or other temporary wetlands for breeding.	**Absent.** Vernal pools required for breeding are absent from the Project Site. Terrestrial habitat required for estivation is absent from cultivated fields.
Western pond turtle (*Actinemys marmorata*)	CSC	Intermittent and permanent waterways including streams, marshes, rivers, ponds and lakes.	**Unlikely.** While marginal habitat, in the form of the canals, exists within the Project Site, estivation and breeding habitat is absent from the Project Site.

TABLE 2. LIST OF SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE VICINITY OF THE GRAPE SOLAR PROJECT SITE

ANIMALS (Continued)
State Species of Special Concern

Species	Status	Habitat	*Occurrence in the Project Site
Temblor Legless Lizard (*Anniella alexanderae*)	SCS	The Temblor legless lizard (previously called silvery legless lizard) occurs mostly underground in warm moist areas with loose soil and substrate and is known only from two sites west of Highway 33 at the base of the Temblor Range between McKittrick and Taft in Kern County.	**Absent.** The Project Site is outside of this species' range.
Coast horned lizard (*Phrynosoma blainvillii*)	CSC	Grasslands, scrublands, oak woodlands, etc. of central California. Common in sandy washes with scattered shrubs.	**Absent.** Habitats required by this species are absent because they have been heavily modified for human use. The nearest documented observation of this species is more than 27 miles to the northwest of the Project Site (CNDDB 2020).
California glossy snake (*Arizona elegans occidentallis*)	CSC	Occurs in arid areas with grassland, scrub, chaparral, and rocky washes. This species is nocturnal and spends the day in burrows.	**Absent.** Habitats required by this species are absent from the Project Site and vicinity.
San Joaquin whipsnake (*Masticophis flagellum ruddocki*)	CSC	Open, dry habitats with little or no tree cover. Found in valley grasslands and saltbush scrub in the San Joaquin Valley.	**Absent.** Habitats required by this species are absent from the Project Site and vicinity.
American white pelican (nesting) (*Pelecanus erythrorhynchos*)	CSC	Nests on islands in large lakes or on ephemeral islands in shallower wetlands.	**Unlikely.** Nesting habitat is absent from the Project Site. This species has been observed flying in the general area in previous years; however, the species is unlikely to stop and nest within the Project Site.
White-faced ibis (*Plegadis chihi*)	CSC	Salt and freshwater marsh as well as grain and alfalfa fields.	**Possible.** Foraging habitat required for this species is present in the form of the agricultural fields within the Project Site. Breeding habitat is absent.
Northern harrier (*Circus cyaneus*)	CSC	Frequents meadows, grasslands, open rangelands, freshwater emergent wetlands; uncommon in wooded habitats.	**Possible.** Harriers were observed foraging over agricultural fields within the general area during previous surveys, and foraging habitat exists on the Project Site. However, breeding habitat is absent.
White-tailed kite (*Elanus leucurus*)	CP	Open grasslands and agricultural areas throughout central California.	**Possible.** Suitable foraging habitat occurs for this species within the Project Site; however, breeding habitat is absent.

TABLE 2. LIST OF SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE VICINITY OF THE GRAPE SOLAR PROJECT SITE

ANIMALS (Continued)
State Species of Special Concern

Species	Status	Habitat	*Occurrence in the Project Site
Mountain plover (*Charadrius montanus*)	CSC	Forages in short grasslands and freshly plowed fields of the Central Valley.	**Possible.** The Project Site provides potential winter foraging habitat for this species; however, the species does not breed in this region.
Burrowing owl (*Athene cunicularia*)	CSC	Frequents open, dry annual or perennial grasslands, deserts, and scrublands characterized by low growing vegetation. Dependent upon burrowing mammals, most notably the California ground squirrel, for nest burrows.	**Possible.** Burrowing owls were not observed onsite during the 2020 site visit. However, site visits for adjacent solar projects in April and May of 2018 and April of 2019 identified burrowing owls in the canal south of Laurel Avenue located 2 miles north of the site as well as in a north-south canal located approximately 1.5 miles north of the northwestern corner of the site. Currently, suitable breeding habitat onsite consists of burrows within canal banks and foraging habitat exists within the winter wheat fields.
Long-eared owl (nesting) (*Asio otus*)	CSC	Occur on edge habitats including in clumps of trees or edges of open forests that are adjacent to grasslands, shrublands, wetlands, marshes, and farmlands. Need stick nests built by other birds in trees.	**Possible.** Although the Project Site does not support suitable nesting habitat for this species except for the potential for nesting to occur on utility poles, small clumps of suitable trees do exist in the vicinity of the site at the off-site tailwater pond which is nearly adjacent to the northeastern portion of the project site. Therefore, long-eared owls may use the Project Site as foraging area.
Black swift (*Cypseloides niger*)	CSC	Migrants found in many habitats of state; in Sierra nests are often associated with waterfalls.	**Absent.** The Project Site does not provide suitable breeding or foraging habitat for this species.
Vaux's swift (*Chaetura vauxi*)	CSC	Migrants move through the foothills of the western Sierra in spring and late summer. Some individuals breed in the region.	**Absent.** The Project Site does not provide suitable breeding or foraging habitat for this species.
Loggerhead shrike (*Lanius ludovicianus*)	CSC	Frequents open habitats with sparse shrubs and trees, other suitable perches, bare ground, and low herbaceous cover. Can often be found in cropland.	**Present.** This species was observed adjacent to the Project Site during the January 2020 site visit. The Grape Solar site may support marginal nesting habitat within vegetated canals of the site, specifically the canal along 25th Avenue.
Yellow-headed blackbird (*Xanthocephalus xanthocephalus*)	CSC	Occurs in freshwater marshes with cattails, tule, and bulrush during the summer and open, cultivated fields and pastures in the winter.	**Possible.** The larger canals of the site support potential breeding and foraging habitat for this species and the smaller canals of the site support foraging habitat for this species.

TABLE 2. LIST OF SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE VICINITY OF THE GRAPE SOLAR PROJECT SITE

ANIMALS (Continued)
State Species of Special Concern

Species	Status	Habitat	*Occurrence in the Project Site
Tulare grasshopper mouse (*Onychomys torridus*)	CSC	Arid shrubland communities in hot, arid grassland and scrub desert associations. These include blue oak woodlands at 450 m (1476 feet); upper Sonoran subshrub scrub community; alkali sink and mesquite associations on the valley floor; and grasslands associations on the sloping margins of the San Joaquin Valley and Carrizo Plain region.	**Absent.** Suitable shrubland habitat is not present within the Project Site.
Short-nosed kangaroo rat (*Dipodomys nitratoids brevinasus*)	CSC	Occur in lighter, powdery soils such as the sandy bottoms and banks of arroyos and other sandy areas with slightly to highly saline soils on gently sloping and rolling low hill-tops with shrubs.	**Absent**. Habitats required by short-nosed kangaroo rats are absent from the Project Site and surrounding agricultural lands due to intensive agricultural use.
Townsend's Big-eared bat (*Corynorhinus townsendii*)	CSC	Primarily a cave-dwelling bat that may also roost in buildings. Occurs in a variety of habitats.	**Possible.** Suitable foraging habitat for this species is present within the Project Site; however, roosting habitat is absent.
Pallid bat (*Antrozous pallidus*)	CSC	Roosts in rocky outcrops, cliffs, and crevices with access to open habitats for foraging. May also roost in caves, mines, hollow trees and buildings.	**Possible.** Although suitable roosting habitat for the pallid bat is absent from the Project Site, the entire site supports suitable foraging habitat for this species.
California mastiff bat (*Eumops perotis ssp.* californicus)	CSC	Frequents open, semi-arid to arid habitats, including conifer, and deciduous woodlands, coastal scrub, grasslands, palm oasis, chaparral and urban. Roosts in cliff faces, high buildings, trees and tunnels.	**Possible.** Although suitable roosting habitat for the California mastiff bat is absent from the Project Site, the entire site supports suitable foraging habitat for this species.
American badger (*Taxidea taxus*)	CSC	Found in drier open stages of most shrub, forest and herbaceous habitats with friable soils.	**Unlikely.** No burrows of the size and shape suitable for this species were observed on the Project Site. It is possible this species may establish burrows within the Project Site; however, it is unlikely that badgers would breed onsite or within the site's vicinity.

TABLE 2: LIST OF SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE VICINITY OF THE GRAPE SOLAR PROJECT SITE

ANIMALS (Continued)
State Species of Special Concern

Species	Status	Habitat	*Occurrence in the Project Site
Ringtail (*Bassariscus astutus*)	CP	Riparian and heavily wooded habitats near water.	**Absent.** Habitat for this species is absent from the Project Site.

***Explanation of Occurrence Designations and Status Codes**

Present: Species observed within the Project Site at time of field surveys or during recent past.
Likely: Species not observed within the Project Site, but it may reasonably be expected to occur there on a regular basis.
Possible: Species not observed within the Project Site, but it could occur there from time to time.
Unlikely: Species not observed within the Project Site, and would not be expected to occur there except, perhaps, as a transient.
Absent: Species not observed within the Project Site, and precluded from occurring there because habitat requirements not met.

STATUS CODES

FE	Federally Endangered
FT	Federally Threatened
FPE	Federally Endangered (Proposed)
FC	Federal Candidate
CE	California Endangered
CT	California Threatened
CR	California Rare
CP	California Fully Protected
CSC	California Species of Special Concern
CC	California Candidate

CNPS	California Native Plant Society Listing
1A	Plants Presumed Extinct in California
1B	Plants Rare, Threatened, or Endangered in California and elsewhere
2	Plants Rare, Threatened, or Endangered in California, but more common elsewhere
3	Plants about which we need more information – a review list
4	Plants of limited distribution – a watch list

2.6 ENDANGERED, THREATENED, OR SPECIAL STATUS ANIMAL SPECIES MERITING FURTHER DISCUSSION

2.6.1 Swainson's Hawk (*Buteo swainsoni*).

Federal Listing Status: None; State Listing Status: Threatened.

The Swainson's hawk is designated as a California Threatened species. The loss of agricultural lands (i.e., foraging habitat) to urban development and additional threats such as riverbank protection projects have contributed to its decline.

Life history and ecology. Swainson's hawks are large, broad-winged, broad-tailed hawks. Male and female Swainson's hawks have similar body types, with a length generally between 17 and 22 inches and a wingspan between 47 and 57 inches. They weigh up to 2.5 pounds.

Swainson's hawks have a high degree of mate and territorial fidelity. They arrive at their nesting sites in March or April, and their nests, measuring three to four feet in diameter, can take up to two weeks to complete. The nest is likely to be a stick nest constructed in a tree. In the Central Valley, Swainson's hawks typically nest in large trees in or peripherally to riparian systems adjacent to suitable foraging habitats. The female will lay and incubate two to four eggs for approximately 28 to 35 days. The male helps with incubation when the female leaves the nest to feed. The young hatch sometime between March and July and do not leave the nest until some 4 to 6 weeks later. Other suitable nest sites include lone trees, groves of trees such as oaks, other trees in agricultural fields, and mature roadside trees. Swainson's hawks forage in large, open fields with abundant prey, including grasslands or lightly grazed pastures, alfalfa and other hay crops, and certain grain and row croplands.

Swainson's hawk survey history on the larger WSP study area: On June 21, 2010 LOA biologists Jeff Gurule and Geoff Cline observed a pair of Swainson's hawks soaring above and around the off-site tailwater pond located nearly adjacent to the northwestern corner of the Project Site. The two hawks vocalized an alarm call when first encountered flying low over the pond and then soared high into the air. The hawks were encountered again within 30 minutes flying low over the off-site tailwater pond. Although approximately 30 minutes was spent in a thorough search for a nest, no Swainson's hawk nest was observed in the trees associated with the off-site tailwater pond. An active barn owl nest was found however. Although the behavior of the Swainson's hawks observed indicated the possibility that a nest may occur in the trees associated with the off-site tailwater pond.

In 2011, surveys for Swainson's hawks were made on March 21 and April 5 by LOA ecologists Katrina Krakow and Nathan Hale, April 12 and 13 by Katrina Krakow, April 19 and 20 by Katrina Krakow and biologist Robert Shields, and May 3, and 17 by Katrina Krakow. The majority of surveys focused on the off-site tailwater pond which has a row of riparian trees along its margins. Shorter surveys were made near the King's River along Jackson Road, approximately 6.5 miles northeast of the Project Site, where Swainson's hawks have been observed in previous years. A pair of Swainson's hawks were observed off of Jackson Road near the Kings River on 21 March, and 5, 12, and 13 April 2011. Only one individual was observed at a time (both individuals were observed separately) starting on April 19th, which may indicate the beginning of nesting, although no nest was located. On 3 May 2011, a Swainson's hawk was observed over the housing of the Lemoore Air Base along Highway 198, approximately 6.5 miles north of the Project Site. A pair of Swainson's hawks were observed over the off-site tailwater pond beginning on 19 April 2011 by LOA ecologist Katrina Krakow and biologist Robert Shields, and only one individual was observed at a time (both individuals were observed separately) starting on 3 May by LOA ecologist Katrina Krakow, which may indicate the beginning of nesting for this pair. These individuals were observed interacting with a pair of red-tailed hawks, which were also observed only singularly near the pond. Two great horned owl nests were observed in trees along the south side of the pond, on 19 April, one owlet was observed in one nest and two owlets were observed in the other nest. However, as at least two pair of Swainson's hawks were observed either over or in the vicinity of the Westlands Solar Park (WSP) study area, both observed pairs of this species most likely forage onsite, although, due to lack of suitable nest trees, they are not expected to nest onsite, however, potentially suitable nesting habitat occurs at the off-site tailwater pond located nearly adjacent to the northwestern corner of the Grape Solar Project Site.

Further multi-year surveys of the off-site tailwater pond area were conducted by LOA biologists during subsequent breeding seasons 2012-2015. Although Swainson's hawks were reliably observed flying over the off-site tailwater pond in each of these years, these surveys likewise failed to detect the presence of a Swainson's hawk nest within the trees surrounding the off-site tailwater pond. The April 15, 2015 survey was the only survey that LOA biologists observed Swainson's hawks land in a tree at the off-site tailwater pond. All other observations were of Swainson's hawks flying overhead.

In the spring of 2012, LOA conducted a Swainson's hawk nest survey of the Westlands Solar Park (WSP) in conjunction with the biological report prepared for the WSP Master Plan and Gen-Tie Corridors Program EIR. The study area included the Project Site as well as accessible lands within a buffer of 10 miles from the WSP Master Plan area. These surveys took place on April 27 by Ms. Krakow and Ms. Jensen; May 3 by Ms. Krakow; and May 4 by Ms. Krakow and Mr. Cline. Accessible lands within the 10-mile radius were surveyed completely except for those lands previously surveyed by ESTEP Ecological Consulting (2011 and 2012). Four active Swainson's nests were observed, all occurring off-site. Active nests were revisited on May 24 by Ms. Krakow and Mr. Cline. Two nests were located approximately 10 miles to the northwest of the site in trees bordering a drainage located northwest of the Town of Huron, and one nest was located 10 miles south of the site just east of Kettleman City in a stand of eucalyptus trees, and one nest was located 9 miles south of the site in a cottonwood tree located south of the southern limit of the WSP Master Plan area just off-site on the eastern side of the canal adjacent to the site near Quail Avenue. During the 2013-2015 spring surveys, this nest was observed to be in active use by a pair of breeding Swainson's hawks. This pair likely uses the WSP study area for foraging, but nesting on the Grape Solar site is unlikely due to absence of suitable nest trees.

The four nests observed by LOA in 2012 were revisited on September 25, 2017 and April 9 and 10, 2018 (including a visit to nest #11 of the Estep report from 2017 on April 9, 10, and May 28, 2018). By September of 2017, nesting activity for the 2017 nesting season could not be confirmed, however, one nest was missing and presumed inactive for 2017. The 2018 nesting season appeared to be late, with surveys in April showing adults near known nesting areas, but not yet engaging in nesting activity. Active migration was observed on April 9, 2018 when over 100 Swainson's hawks were observed off-site south of Nevada Avenue. On May 28, 2018, when the nest locations were revisited, only one of the five nest locations (one of which was previously missing) surveyed was an active nest, near Racine Avenue. These nest locations were checked again on May 29, 2019, where two nests were determined to be active in 2019, the one near Quail Avenue and the one near Racine Avenue. The western nest tree along Los Gatos Creek near Huron did not have a nest in the tree and the eastern nest tree had been removed as a part of a presumed creek flood protection project. Nest #11 from Estep's survey supported nesting ravens in 2019. Figure 5 illustrates known Swainson's hawk nest locations within the project vicinity.

Potential to occur within the Project Site. Swainson's hawks are known to forage in areas surrounding the Project Site. Groupings of trees and trees along the Kings River to the east, provide suitable nesting and perching habitat, and the fallow and agricultural lands within the Project Site provide suitable foraging habitat. The nearest previously observed Swainson's hawk nest is located approximately 3.0 miles east of the Project Site (Estep 2017). Potentially suitable nesting habitat occurs at the off-site tailwater pond nearly adjacent to the northwestern corner of the Grape Solar Project Site.

LOA had several observations of Swainson's hawks flying or foraging on the ground near the Project Site, including groups as large as 45 individuals. Therefore, Swainson's hawks are present within the Project Site and likely forage onsite throughout the months of March through September; however, breeding habitat is likely absent onsite.

Nesting on the Grape Solar site is unlikely due to absence of suitable nest trees, as there is only one moderately suitable cottonwood tree within the canal adjacent to 25th Avenue. Although no known historic nests are along or within a half-mile of the project site, suitable nest trees do exist nearly adjacent to the northwestern corner of the project site at the site of the former tailwater pond. Therefore, Swainson's hawks may nest in suitable trees located within 0.5 miles of the project site (which is the typical setback distance for active nest sites).

For a detailed cumulative analysis of impacts to Swainson's hawks, see Appendix C of this report.

2.6.2 Burrowing Owl (*Athene cunicularia*).

Federal Listing Status: None; State Listing Status: Species of Special Concern.

The burrowing owl is designated as a California Species of Special Concern. This designation was based on the species' declining population within the state over the past 40 years. The population decline is mainly due to habitat destruction resulting from development and agricultural practices.

Life history and ecology. The burrowing owl is a small, long-legged bird that averages a height of 9.5 inches, has an average wingspan of 23 inches, and weighs an average of 5.25 ounces. Burrowing owls are unique in that they are the only owl that regularly lives and breeds in underground nests. In California, these birds typically occur in the Central and Imperial Valleys, primarily utilizing ground squirrel burrows (or the burrows of other animals, e.g., badgers, prairie dogs and kangaroo rats) found in grasslands, open shrub lands, deserts, and, to a lesser extent, grazed and agricultural lands. Burrowing owls in this region are typically found at elevations below 250 ft. and exhibit strong site fidelity. Pairs have been known to return to the same area year after year, and some pairs are known to utilize the same burrow as the previous year. Burrowing owls are colonially nesting raptors, and colony size is indicative of habitat quality. It is not uncommon to find burrowing owls in developed and cultivated areas where California ground squirrels are active.

Burrowing owls feed on various small mammals including deer mice, voles, and rats. They also prey on various invertebrates including crickets, beetles, grasshoppers, spiders, centipedes, scorpions and crayfish. Peak hunting periods occur around dusk and dawn.

Burrowing Owl history on the larger WSP study area: Burrowing owls were observed utilizing existing burrows along canals located north and south of the Project Site. The Project Site provides suitable habitat for this species in the form of California ground squirrel burrows present in fallow fields and canal banks. Field surveys did not consist of 100% coverage surveys and were conducted mainly as driving surveys on public roads, farm roads, and canal levees with short walking surveys when animals of plants of particular biological note were observed. Many of these owls were paired and presumably nesting with a minimum of 8 pair in 2011, a minimum of 12 pair in 2012, a minimum of 8 pair in 2014, and a minimum of 6 pair in 2018. Suitable nesting habitat for burrowing owls was present in the fallow fields and along the canal banks in the form of California ground squirrel burrows. As 100% coverage surveys were not conducted, the precise extent of burrowing owls within the WSP study area is unknown, however, LOA has identified 79.60% of the WSP study area to be either year-round suitable habitat (3,255.8 acres) or seasonably suitable habitat (13,245 acres) (see Appendix D of this report for details).

Potential to occur within the Project Site. The site was evaluated on January 22, 2020 for the potential for the site to support burrowing owls; although no burrowing owls were observed, potential suitable habitat exits within the project site in the form of ground squirrel burrows and pipes. Adjacent lands were surveyed on April 10 and May 28, 2018 and April 11, 2019. During 2018 surveys, three pair of burrowing owls and one single burrowing owl were observed along the canal south of and paralleling Laurel Avenue (2 miles north of the project site) with one burrowing owl observed approximately 1.5 miles to the north of the northwest corner of the Project Site; on April 11, 2019, no burrowing owls were observed on or near the project site. Previous surveys in 2011 and 2012 identified the closest known occurrence of burrowing owls to the site, which were within a half mile and within a mile to the south of the site in a canal. Currently, suitable habitat onsite consists mainly of man-made ‘burrows’, such as pipes as well as ground squirrel burrows within and along the canals onsite. The site provides suitable nesting/burrow habitat in the form of California ground squirrel burrows along the edges of the agricultural fields and in and along the canals, and in the form of pipes in or on the ground, as well as foraging habitat within the agricultural fields for burrowing owls. Canal maintenance activities have the potential to impact locations of burrowing owls, as many large canals support burrowing owls, such as the canal south of Laurel Avenue and the Empire Westside Main Canal, where several burrowing owls were identified in previous surveys in the area. In between maintenance activities and recolonization, the burrowing owls would take up temporary residence elsewhere.

2.6.3 San Joaquin Kit Fox (*Vulpes macrotus mutica*).

Federal Listing Status: Endangered; State Listing Status: Threatened.

By the time the U.S. Fish and Wildlife Service listed it as an endangered species under the authority of the Federal Endangered Species Act on 11 March 1967, the San Joaquin kit fox had been extirpated from much of its historic range. In 1998, the USFWS adopted a final recovery plan for the San Joaquin kit fox. On 27 June 1971, the State of California listed the kit fox as a threatened species.

Life history and ecology. The San Joaquin kit fox, the smallest North American member of the dog family (Canidae), historically occupied the dry plains of the San Joaquin Valley, from San Joaquin County to southern Kern County (Grinnell et al. 1937). Critical habitat has yet to be established for the San Joaquin kit fox. Local surveys, research projects, and incidental sightings indicate that kit foxes currently occupy available habitat on the San Joaquin Valley floor and in the surrounding foothills.

Kit foxes prefer habitats of open or low vegetation with loose soils. In the northern portion of their range, they occupy grazed grasslands and, to a lesser extent, valley oak woodlands. In the southern and central portion of the Central Valley, kit foxes are found in valley sink scrub, valley saltbrush scrub, upper Sonoran subshrub scrub, and annual grassland (USFWS 1998). Kit foxes may also be found in grazed grasslands, urban settings, and in areas adjacent to tilled or fallow fields (USFWS 1998).

Kit fox diets vary geographically, seasonally, and annually. In the central portion of their range, which includes lands around the Project Site, known prey includes white-footed mice, insects, California ground squirrels, black-tailed hares, San Joaquin antelope squirrels, kangaroo rats, desert cottontails, and ground-nesting birds (Archon 1992; Jensen 1972).

The kit fox requires underground dens to raise pups, regulate body temperature, and avoid predators and other adverse environmental conditions (Golightly and Ohmart 1984). In the central portion of their range, they usually occupy burrows excavated by small mammals, such as ground squirrels. Denning habitat consists of ground squirrel complexes in which some burrows have been enlarged to 4 to 6 inches in diameter for the length of a human arm (approximately 2 ft.).

Potential to occur within the Project Site. Lands surrounding the Project Site consist of cultivated and fallow agricultural fields as well as undeveloped rangeland further out to the south and southwest in the Kettleman Hills. The Project Site itself has been heavily managed for agricultural uses for decades. Agricultural lands are not generally suitable for the San Joaquin kit fox.

A few burrows were observed that were of suitable dimensions for kit fox, but most of these burrows were or appeared to be occupied by California ground squirrels or were pipes either installed in the ground or laying on top of the ground; however, protocol-level surveys consisting of 100% visual coverage were not conducted for the Project Site. Having been modified for agricultural use, the Project Site provides a limited prey base especially in the cultivated fields and, therefore, constitutes poor foraging habitats for kit fox. No kit fox, or their sign, was observed during any of the site visits by LOA ecologists between 2011 and 2020.

Of primary interest for this assessment are kit fox records from the vicinity of the project site. According to the CNDDB there have been a total of 23 historical (1975-2000) sightings within the ten miles of the site (Figure 4) (CDFW 2020). All of these sightings occur near the border of the 10-mile radius. Based on the site's location and the distribution of kit fox occurrences in its vicinity, the site may only occasionally be used for regional movements of individual kit fox. These sightings occurred to the east, west, south, and north of the Project Site. Multiple large irrigation canals and drainage ditches run through the Project Site and vicinity which may act as movement corridors; however, should a kit fox utilize these corridors, the fox would have to travel through miles of marginal to poor habitat before reaching the Project Site, which itself holds little habitat value.

In summary, the Project Site offers marginal habitat primarily in fallowed fields; the surrounding lands provide similar habitat; and 23 historical kit fox sightings occur within ten miles of the Project Site, but not within the Project Site itself. Considering the highly disturbed condition of the Project Site, their isolation from extant kit fox populations, and their marginal to poor suitability as foraging or denning habitat, it is unlikely any kit fox have taken up residence within the Project Site, and they are not expected to occur onsite. The Project Site may at most be used on rare occasion for dispersing kit foxes. The Grape Solar facility is planned to include the installation of wildlife friendly fencing in order to allow kit fox to move unimpeded through the solar facility. All existing irrigation canals and drainage ditches will be avoided by the solar facilities and are planned to continue operations as they currently do. Therefore, any kit foxes would not be prevented from moving through the Project Site after completion of the solar facilities.

2.6.4 Other Migratory Birds and their Nests. Federal Listing Status: Protected; State Listing Status: Protected.

Other migratory birds include most bird species with the exception of house sparrow (*Passer domesticus*) and European starling, among a few other non-native birds. Migratory birds and their nests are protected under the Federal Migratory Bird Treaty Act of 1918 and California Fish and Game Code (Sections 3503 and 3513). Between approximately February 1 and August 31, migratory birds nest throughout California and the Central Valley on the ground and in grasses, shrubs, and trees.

Potential to occur onsite. Ground nesting birds such as burrowing owl (see Section 3.3.7) and killdeer (*Charadrius vociferous*), among other disturbance-tolerating birds, may utilize the ground and agricultural vegetation of the site for nesting. Trees in the canals on the site or adjacent to the site may also be used by tree-nesting birds.

2.7 JURISDICTIONAL WATERS

Jurisdictional waters include rivers, creeks, and drainages that have a defined bed and bank and which, at the very least, carry ephemeral flows. Jurisdictional waters also include lakes, ponds, reservoirs, and wetlands. Such waters may be subject to the regulatory authority of the U.S. Army Corps of Engineers (USACE), the California Department of Fish and Wildlife (CDFW), and the California Regional Water Quality Control Board (RWQCB). See Section 3.2.4 of this report for additional discussion of these agencies' roles and responsibilities.

The nearest known Water of the U.S. is the Kings River to the north and east of the Project Site. Two large irrigation canals run along the eastern and western sides of the site, and one large and two smaller canals run though the site itself; however, these canals do not receive water from the Kings River, which is at a lower elevation than the Project Site. Artificial waterways such as canals are typically not claimed by the agencies unless they receive water from a Known Water of the U.S., and then return water to a Known Water of the U.S. Thus, even if the canals on the Project Site received water from a Known Water of the U.S., the Kings River, those waters do not return to the Kings River. Therefore, it is unlikely that canals and ditches would fall under the jurisdiction of the USACE. However, only the USACE can make a jurisdictional determination of waters. Furthermore, waters, while likely not regulated by the USACE may be claimed as jurisdictional by the RWQCB under the broader definition of Waters of the State under the Porter-Cologne Water Quality Act, which encompasses any surface or groundwater within the boundaries of the state. Thus, although the canals may not fall under federal jurisdiction, the RWQCB may assert jurisdiction over those portions of the canal that function as wetlands. The CDFW typically only asserts jurisdiction over ponds, lakes, and natural drainages or manmade features that replace natural drainages and, therefore, is unlikely to regulate alterations to the manmade canals mentioned above.

To summarize, regulated waters do not occur onsite. The canals and drainage features on the Project Site are unlikely to be regulated by the USACE; however, the RWQCB may assert jurisdiction over some of these features, while CDFW is not likely to do so. Jurisdiction would need to be evaluated on a case-by-case basis.

3 IMPACTS AND MITIGATIONS

3.1 SIGNIFICANCE CRITERIA

General plans, area plans, and specific projects are subject to the provisions of the California Environmental Quality Act. The purpose of CEQA is to assess the impacts of proposed projects on the environment before they are constructed. For example, site development may require the removal of some or all of its existing vegetation. Animals associated with this vegetation could be destroyed or displaced. Animals adapted to humans, roads, buildings, pets, etc., may replace those species formerly occurring on a site. Plants and animals that are state and/or federally listed as threatened or endangered may be destroyed or displaced. Sensitive habitats such as wetlands and riparian woodlands may be altered or destroyed. These impacts may be considered significant. According to *2019 CEQA Status and Guidelines* (2019), "Significant effect on the environment" means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic interest. Specific project impacts to biological resources may be considered "significant" if they will:

- 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 the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service;
- 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 California Department of Fish and Wildlife or U.S. Fish and Wildlife Service;
- Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or

- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

3.2 RELEVANT GOALS, POLICIES, AND LAWS

3.2.1 Threatened and Endangered Species

State and federal "endangered species" legislation has provided the California Department of Fish and Wildlife (CDFW) and the U.S. Fish and Wildlife Service (USFWS) with a mechanism for conserving and protecting plant and animal species of limited distribution and/or low or declining populations. Species listed as threatened or endangered under provisions of the state and federal endangered species acts, candidate species for such listing, state species of special concern, and some plants listed as endangered by the California Native Plant Society are collectively referred to as "species of special status." Permits may be required from both the CDFW and USFWS if activities associated with a proposed project will result in the "take" of a listed species. "Take" is defined by the state of California as "to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture or kill" (California Fish and Game Code, Section 86). "Take" is more broadly defined by the federal Endangered Species Act to include "harm" (16 USC, Section 1532(19), 50 CFR, Section 17.3). Furthermore, as "responsible agencies" under CEQA, the CDFG and the USFWS both review CEQA documents involving projects which may have an impact on state- and/or federally-protected species in order to determine the adequacy of their treatment of protected species issues and to make project-specific recommendations for their conservation.

3.2.2 Migratory Birds

State and federal laws also protect most birds. The Federal Migratory Bird Treaty Act (16 U.S.C., sec. 703, Supp. I, 1989) prohibits killing, possessing, or trading in migratory birds, except in accordance with regulations prescribed by the Secretary of the Interior. This act encompasses whole birds, parts of birds, and bird nests and eggs.

3.2.3 Birds of Prey

Birds of prey are also protected in California under provisions of the State Fish and Game Code, Section 3503.5, which states that it is "unlawful to take, possess, or destroy any birds in the order *Falconiformes* or *Strigiformes* (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto." Construction disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings, or otherwise lead to nest abandonment. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered "taking" by the CDFW.

3.2.4 Wetlands and Other Jurisdictional Waters

The USACE regulates the filling or grading of waters of the U.S. under the authority of Section 404 of the Clean Water Act. Natural drainage channels and adjacent wetlands may be considered "waters of the United States" or "jurisdictional waters" subject to the jurisdiction of the USACE. The extent of jurisdiction has been defined in the Code of Federal Regulations and clarified in federal courts.

Currently, waters of the U.S. are defined in 33 CFR §328.3(a) as:

1. All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
2. All interstate waters, including interstate wetlands;
3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:
    a. Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
    b. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
    c. Which are used or could be used for industrial purpose by industries in interstate commerce;
4. All impoundments of water otherwise defined as waters of the United States under the definition;
5. Tributaries to waters identified in paragraphs (a)(1) through (4) of this section;
6. The territorial seas;
7. Wetlands adjacent to waters (other than waters which are themselves wetlands) identified in paragraphs (a)(1) through (6) of this section.

All activities that involve the discharge of dredge or fill material into Waters of the U.S. are subject to the permit requirements of the USACE. Such permits are typically issued on the condition that the applicant agrees to provide mitigation that result in no net loss of wetland functions or values. No permit can be issued until the RWQCB issues a Section 401 Water Quality Certification (or waiver of such certification) verifying that the proposed activity will meet state water quality standards.

Under the Porter-Cologne Water Quality Control Act of 1969, the State Water Resources Control Board has regulatory authority to protect the water quality of all surface water and groundwater in the State of California ("Waters of the State"). Nine RWQCBs oversee water quality at the local and regional level. The RWQCB for a given region regulates discharges of fill or pollutants into Waters of the State through the issuance of various permits and orders. Discharges into Waters of the State that are also Waters of the U.S. require a Section 401 Water Quality Certification from the RWQCB as a prerequisite to obtaining certain federal permits, such as a Section 404 Clean Water Act permit. Discharges into all Waters of the State, even those that are not also Waters of the U.S., require Waste Discharge Requirements (WDRs), or waivers of WDRs, from the RWQCB.

The RWQCB also administers the Construction Stormwater Program and the federal National Pollution Discharge Elimination System (NPDES) program. Projects that disturb one or more acres of soil must obtain a Construction General Permit under the Construction Stormwater Program. A prerequisite for this permit is the development of a Stormwater Pollution Prevention Plan (SWPPP) by a certified Qualified SWPPP Developer. Projects that discharge wastewater, stormwater, or other pollutants into a Water of the U.S. may require a NPDES permit.

CDFW has jurisdiction over the bed and bank of natural drainages and lakes according to provisions of Section 1601 and 1602 of the California Fish and Game Code. Activities that may substantially modify such waters through the diversion or obstruction of their natural flow, change or use of any material from their bed or bank, or the deposition of debris require a Notification of Lake or Streambed Alteration. If CDFW determines that the activity may adversely affect fish and wildlife resources, a Lake or Streambed Alteration Agreement will be prepared. Such an agreement typically stipulates that certain measures will be implemented to protect the habitat values of the lake or drainage in question.

3.2.5 Local Policies or Habitat Conservation Plans

The Resource Conservation Elements of the 2035 Kings County General Plan contains a number of goals and policies on biological resources. These County policies are outlined below.

Wetland and Riparian Areas. The County's goal is to conserve the functions and values of wetland communities and riparian areas while allowing compatible uses where appropriate.

Fish and Wildlife Habitat. The County's goal is to protect, restore, and enhance habitats in Kings County that support fish and wildlife species so that populations are maintained at viable levels.

Vegetation. The County's goal is to protect the valuable vegetation resources of each County.

3.3 POTENTIALLY SIGNIFICANT PROJECT IMPACTS/MITIGATION

The Grape Solar project involves the conversion of approximately 1,753 acres of agricultural fields to solar generation facilities and the following sections assume that the entire project site will be affected by the project.

Potentially significant project impacts to biological resources and mitigations are discussed below.

3.3.1 Loss of Habitat for Special Status Plants

Potential Impacts. Three special-status vascular plant species are known to occur in the vicinity of the Project Site: California jewelflower (*Caulanthus californicus*), Kern mallow (*Eremalche parry* ssp. *kernensis*), and San Joaquin woolly threads (*Monolopia congdonii*) (see Table 1). Due to the many decades of agricultural disturbance of the Project Site, habitat for these three plant species are absent. Therefore, the planned solar project would not affect regional populations of these species and potential impacts would be less-than-significant.

Mitigation. Mitigation measures are not warranted.

3.3.2 Loss of Habitat for Special Status Animals

Potential Impacts. Of the 38 special-status animal species potentially occurring in the region, 24 species would be absent or unlikely to occur within the Project Site due to unsuitable habitat conditions. These include the vernal pool fairy shrimp, valley elderberry longhorn beetle, California tiger salamander, western spadefoot, western pond turtle, Temblor legless lizard, coast horned lizard, blunt-nosed leopard lizard, giant garter snake, California glossy snake, San Joaquin whipsnake, American white pelican (nesting), black swift, Vaux's swift, western yellow-billed cuckoo, Nelson's antelope squirrel, giant kangaroo rat, Fresno kangaroo rat, Tipton kangaroo rat, short-nosed kangaroo rat, Tulare grasshopper mouse, American badger, San Joaquin kit fox, and ringtail. Construction of the Grape Solar project would have no effect on loss of habitat for these species because there is little or no likelihood that they are present.

An additional 14 species may regularly or occasionally utilize the Project Site for foraging, including the western snowy plover, mountain plover, white-faced ibis, Swainson's hawk, northern harrier, white-tailed kite, western burrowing owl, long-eared owl, loggerhead shrike, yellow-headed blackbird, tricolored blackbird, Townsend's big-eared bat, pallid bat, and California mastiff bat. The Project Site does not provide regionally important foraging habitat for these species. Migrant species such as the mountain plover pass through or over many types of habitats en route to breeding or wintering habitat. White-faced ibis may possibly forage in agricultural fields of the Project Site from time to time. Considerable habitat suitable for migratory movements and winter foraging would continue to be available for these species on other lands within the region following development.

The burrowing owl is well known to occur within the greater WSP Master Plan Area and in the vicinity of the project site (LOA surveys 2011-2019), with the nearest recorded observation to the Grape Project site being from 2011 approximately 0.5 miles south of the project site. The canals of the region provide important breeding and burrow locations for the burrowing owl, and the adjacent agricultural fields provide necessary foraging habitat. The development of the Project Site could result in the loss of foraging habitat for burrowing owls. See Appendix D for an analysis of potential impact. Potential locations of burrowing owl burrows along the onsite canals will be avoided, as the project will not be impacting the canals, and the canals will continue to be managed as they are currently managed, which will also benefit other species using the canal system to move through the area. Adequate suitable foraging habitat exists in the vicinity of the Grape Solar Project site to support these owls (See Appendix D).

Therefore, development of the solar project would result in a less-than-significant impact on these species.

The three bat species listed above, including the Townsend's big-eared bat, pallid bat, and California mastiff bat may forage over the site; however, roosting habitat is absent from the site for these species.

Mitigation. No mitigations are warranted for loss of habitat for special status animals.

For species that are subject to potentially significant impacts due to construction of the Grape Solar project, as discussed below, mitigation measures are identified below for each as follows: raptors and migratory birds (Mitigation 3.3.3); San Joaquin kit fox (Mitigation 3.3.4); American badger (Mitigation 3.3.5); Swainson's hawk (Mitigation 3.3.6) and; burrowing owl (Mitigation 3.3.7).

3.3.3 Disturbance to Active Raptor and Migratory Bird Nests

Potential Impacts. In addition to the Swainson's hawk and burrowing owl (discussed below in Sections 3.3.6 and 3.3.7), several other raptor species such as the northern harrier, prairie falcon, peregrine falcon, and red-tailed hawk are known to forage near the site. Additionally, the Project Site area provides nesting habitat for a number of migratory bird species, including, but not limited to, the snowy plover, black-necked stilt, great-horned owl, common raven, loggerhead shrike, house finch, Brewer's blackbird, and tricolored blackbird. Nearly all native bird species are protected by the federal Migratory Bird Treaty Act. The canal and ditch habitat, as well as power poles and barren ground on the Project Site, provide potential nesting habitat for these species. If birds were to nest in these areas in the future prior to construction, such project-related activities could result in the abandonment of active nests or direct mortality to these birds. Construction activities that adversely affect the nesting success of raptors or result in mortality of individual birds constitute a violation of state and federal laws (see Section 3.2.2 and 3.2.3) and would be considered a significant impact under CEQA.

Mitigation. In order to minimize construction disturbance to active raptor and other bird nests, the following measure(s) will be followed as informed by a 2014 early consultation letter from CDFW as necessary prior to the construction of the Grape Solar project:

Mitigation 3.3.3a **(*Pre-construction surveys*).** If tree removal, site preparation, grading, or construction is planned to occur within the breeding period (i.e., between February 1 and August 31), a qualified biologist will conduct pre-construction surveys for active nests of migratory birds within 14 days of the onset of these activities. If construction activity is planned to commence outside the breeding period, no pre-construction surveys are required for nesting birds and raptors.

Mitigation 3.3.3b **(*Monitoring Active Nests*).** Should any active nests be discovered in or near proposed construction zones, a qualified biologist shall continuously monitor identified nests for the first 24 hours prior to any construction related activities to establish a behavioral baseline. Once work commences, continuously monitor all nests to detect any behavioral changes as a result of the

Project. If behavioral changes are observed, stop the work causing that change and consult with the California Department of Fish and Wildlife for additional avoidance and minimization measures.

Mitigation 3.3.3c **(*Establish Buffers*).** Alternatively, should any active nests be discovered in or near proposed construction zones, the biologist will establish a 250-foot construction-free buffer around the nest for non-listed birds, 500-foot buffer for unlisted raptors, and a half-mile for listed bird species. This buffer will be identified on the ground with flagging or fencing and will be maintained until the biologist has determined that the young have fledged. Variance from these setback distances may be allowed if a qualified biologist provides compelling biological or ecological reason to do so and if CDFW is notified in advance of implementation of a no disturbance buffer variance.

Mitigation 3.3.3d **(*Tailgate Training*).** All construction and operations workers on each solar project site shall be trained by a qualified biologist. The tailgate training shall include a description of the Migratory Bird Treaty Act, instructions on what to do if an active nest is located, and the importance of capping pipes and pipe-like structures standing upright in order to avoid birds falling into the pipes and getting stuck.

Implementation of the above measures would ensure that construction of the solar project would have no impact on nesting raptors and migratory birds and that the project would be in compliance with state and federal laws protecting nesting birds.

3.3.4 Impacts to San Joaquin Kit Fox

Potential Impacts. The entire Project Site consists of agricultural habitat. Of primary interest for this assessment are kit fox records from the vicinity of the project site. According to the CNDDB there have been a total of 23 historical (1975-2000) sightings within the ten miles of the site (Figure 4) (CDFW 2020). All of these sightings occur near the border of the 10-mile radius. Based on the site's location and the distribution of kit fox occurrences in its vicinity, the Project Site may only rarely, if at all, be used for regional movements of individual kit fox. These sightings occurred to the east, west, south, and north of the Project Site. Several irrigation canals run through and along the Project Site which may act as movement corridors; however, should a kit fox utilize these corridors, the fox would have to travel through miles of marginal to poor habitat before reaching the Project Site, which itself holds little habitat value. Although a few burrows were observed during the surveys that were of suitable dimensions for kit fox, most of these burrows were or appeared to be occupied by California ground squirrels or open pipes (both installed in the ground and laying on top of the ground. As discussed in Section 2.6.3, a majority of the Project Site provide poor habitat and fallow fields and canals offer marginal habitat for this species. While it is unlikely kit fox have, or would take up residence within the Project Site under current site conditions, kit foxes from populations reported from the surrounding areas may pass through and possibly forage within the Project Site from time to time during regular dispersal movements. To be prudent, the following measures are identified:

Mitigation. The following measures shall be implemented in conjunction with the construction of the project site.

Mitigation Measure 3.3.4a (Pre-construction surveys). Pre-construction surveys shall be conducted no less than 14 days and no more than 30 days prior to the beginning of ground disturbance, construction activities, and/or any project activity likely to impact the San Joaquin kit fox. These surveys shall be conducted in accordance with the USFWS Standard Recommendations. The primary objective is to identify kit fox habitat features (e.g., potential dens and refugia) on the solar project site and evaluate their use by kit foxes. If an active kit fox den is detected within or immediately adjacent to the area of work, the USFWS shall be contacted immediately to determine the best course of action.

Mitigation Measure 3.3.4b (Avoidance). Should kit fox be found to be using the Project Site during preconstruction surveys, the construction activity shall avoid the habitat occupied by kit fox and the Sacramento Field Office of the USFWS and the Fresno Field Office of CDFW shall be notified.

Mitigation Measure 3.3.4c (Tailgate Training). All workers on the Grape Solar project shall attend a tailgate training that includes a description of the species, a brief summary of their biology, and minimization measures and instructions on what to do if a San Joaquin kit fox is observed on the solar project site.

Mitigation Measure 3.3.4d (Minimization of Potential Disturbance to Kit Fox). Whether or not kit foxes are found to be present, all permanent and temporary construction activities and other types of project-related activities shall be carried out in a manner that minimizes potential disturbance to kit foxes. Minimization measures include, but are not limited to: restriction of project-related vehicle traffic to established roads, construction areas, and other designated areas; inspection and covering of structures (e.g., pipes), as well as installation of escape structures, to prevent the inadvertent entrapment of kit foxes; restriction of rodenticide and herbicide use; and proper disposal of food items and trash.

Mitigation Measure 3.3.4e (Mortality Reporting). The Sacramento Field Office of the USFWS and the Fresno Field Office of CDFW shall be notified in writing within three working days in case of the accidental death or injury to a San Joaquin kit fox during project-related activities. Notification must include the date, time, location of the incident or of the finding of a dead or injured animal, and any other pertinent information.

Mitigation Measure 3.3.4d (Wildlife-Friendly Fencing). The perimeter fencing surrounding each phase of the Grape Solar project shall consist of wildlife-friendly or permeable fencing that allows San Joaquin kit fox and other wildlife to move through the site unimpeded. The bottom of the perimeter fencing shall be 5 to 7 inches above the ground, as measured from the top of the ground to the lowest point of the fence. The bottom of the fence edges shall be knuckled (wrapped back to form a smooth edge) to allow wildlife to pass through safely. The fencing shall not be electrified.

Implementation of these measures would reduce impacts to the San Joaquin kit fox to a less-than-significant level and would minimize the risk that construction activities during the development of the Grape Solar project would result in mortality to individual kit foxes. Should kit fox be found within the solar project site, the applicant may wish to contact the USFWS for implementation of a Safe Harbor Agreement. If allowed, this agreement will allow the applicant "assurances that additional land use restrictions as a result of their voluntary conservation actions would not be imposed by the USFWS" (USFWS, 1998).

3.3.5 Impacts to American Badgers

Potential Impacts. Given the observations of American badgers, a California Species of Special Concern, on nearby lands with similar habitats to those of the Project Site, the potential exists that the American badger may reside within the Project Site. No badgers or badger burrows were observed in the area during any of the surveys of the Project Site conducted from 2011 through 2020. However, the surveys were conducted primarily through driving field edges with limited foot coverage of the Project Site and took place during the day when badgers are not typically active above ground. Potential badger habitat was found on the Project Site in the form of fallow fields. While the occurrence of badgers is expected to be unlikely, it cannot be ruled out. Therefore, the project has the potential to result in a significant impact to American badgers.

Mitigations. Implementation of the following measures prior to the construction of the Grape Solar project will reduce impacts to American badgers from direct mortality to a less-than-significant level.

Mitigation Measure 3.3.5a (Pre-construction Surveys). During the course of the preconstruction surveys for other species, a qualified biologist shall also determine the presence or absence of badgers prior to the start of construction. If badgers are found to be absent, a report shall be written to the applicant so stating and no other mitigations for the protection of badgers shall be warranted.

Mitigation Measure 3.3.5b (Avoidance and Monitoring). If an active badger den is identified during pre-construction surveys within or immediately adjacent to an area subject to construction, a construction-free buffer of up to 300 feet shall be established around the den. Once the biologist has determined that badger has vacated the burrow, the burrow can be collapsed or excavated, and ground disturbance can proceed. Should the burrow be determined to be a natal or reproductive den, and because badgers are known to use multiple burrows in a breeding burrow complex, a biological monitor shall be present onsite during construction activities in the vicinity of the burrows to ensure the buffer is adequate to avoid direct impact to individuals or natal/reproductive den abandonment. The monitor will be required to be present until it is determined that young are of an independent age and construction activities would not harm individual badgers.

Mitigation Measure 3.3.5c (Tailgate Training). All workers on the solar project shall attend a tailgate training that includes a description of the species, a brief summary of its biology, and minimization measures and instructions on what to do if an American badger is observed.

Implementation of the above measures would reduce potential impacts to the American badger to a less-than-significant level.

3.3.6 Impacts to Nesting and Foraging Habitat for Swainson's Hawk

Potential Impacts. Swainson's hawks are known to nest in the general vicinity of the Project Site, with the nearest previously observed Swainson's hawk nests (2017) located approximately 3.0 miles east of the Project Site. Only one marginally suitable nesting tree occurs on the Project Site within the canal adjacent to the 25th Avenue alignment; the off-site former tailwater pond, which is nearly adjacent to the northwestern corner of the Project Site supports potentially suitable nesting habitat. This is within a half-mile of the site (which would be the typical construction-free buffer distance). Construction activities occurring near an active Swainson's hawk nest could adversely affect nesting success or result in mortality of individual birds constitute a violation of state and federal laws (see Section 3.2.2 and 3.2.3) and would be considered a significant impact under CEQA.

Swainson's hawks are known to forage in the vicinity of the Project Site. As part of its biological assessment for the Program EIR on the Westlands Solar Park Master Plan and Gen-Tie Corridors Plan, conducted in 2017, LOA completed a comprehensive analysis of potential impacts to Swainson's hawk foraging habitat associated with development of the WSP Master Plan area and all other solar projects within a 10-mile radius of the WSP plan area. The analysis identified all known Swainson's hawk nests that were previously observed during surveys by LOA or others. In 2018 and 2019, LOA biologists conducted follow-up surveys to identify currently active nests. LOA biologists also reviewed and updated their detailed 2017 analysis of foraging habitat within a 10-mile radius of the WSP plan area and concluded that the abundant habitat that would remain after development of the WSP, and all other cumulative projects (including projects proposed since 2017) within this 10-mile radius, would be more than sufficient to support all of the known Swainson's hawk nests within this radius, with surplus capacity to support additional nesting pairs. (The full analysis is contained in Appendix C of this report.)

Therefore, it was concluded that full buildout of the WSP plan area would not significantly impact Swainson's hawk foraging habitat. As discussed, this biological report constitutes a technical report for the MND on the Grape Solar project. Since the MND is a subsequent CEQA document that is being tiered off the Program EIR for the WSP Master Plan and Gen-Tie Corridors Plan, the biological analysis in the PEIR applies to the MND and this biological report, and is incorporated into them by reference. As such, the conclusions of the Program EIR with respect to impacts to foraging habitat resulting from WSP development, as well as cumulative impacts associated with WSP development and other projects within a 10-mile radius of the WSP plan area, are fully applicable to the Grape Solar project. Accordingly, the conclusions of less-than-significant impact and less-than-significant cumulative impact to Swainson's hawk foraging habitat from the WSP PEIR apply equally to this analysis. Therefore, the project-specific impacts and the cumulative impacts to Swainson's hawk foraging habitat resulting from construction of the Grape Solar project would be less than significant.

Implementation of the following mitigation will reduce impacts to nesting Swainson's hawks to a less-than-significant level.

Mitigation. The following measures shall be implemented.

Mitigation 3.3.6a (Pre-construction Surveys). During the nesting season prior to the construction on the Grape Solar project site within a half-mile of a potential nest tree, preconstruction surveys shall be conducted within the construction zones and adjacent lands to identify any nesting pairs of Swainson's hawks. These surveys will conform to the guidelines of CDFW as presented in *RECOMMENDED TIMING AND METHODOLOGY FOR SWAINSON'S HAWK NESTING SURVEYS IN CALIFORNIA'S CENTRAL VALLEY,* Swainson's Hawk Technical Advisory Committee, May 31, 2000. No preconstruction surveys are required for construction activity located farther than a half-mile from a potential nest tree.

Mitigation 3.3.6b (Establish Buffers). Should any active nests be discovered in or near proposed construction zones, the qualified biologist shall establish a suitable construction-free buffer around the nest. This buffer shall be identified on the ground with flagging or fencing and shall be maintained until the biologist has determined that the young have fledged.

Mitigation Measure 3.3.6c (Tailgate Training). All workers on the construction of the Project Site shall attend tailgate training that includes a description of the species, a brief summary of its biology, and minimization measures and instructions on what to do if a Swainson's hawk is observed on or near the construction zone.

Implementation of the above measure would reduce impacts to nesting Swainson's hawks to a less-than-significant level.

3.3.7 Impacts to Burrowing Owls

Potential Impacts. The site was evaluated on January 22, 2020 for the potential for the site to support burrowing owls. Although burrowing owls were not observed onsite or within the site vicinity during the January 22, 2020 site visit. Previous surveys for adjacent projects were conducted on April 10 and May 28, 2018 and April 11, 2019. During 2018 surveys, three pair of burrowing owls and one single burrowing owl were observed 2.0 miles north of the site in the canal south of and paralleling Laurel Avenue, with one burrowing owl being observed approximately 1.5 miles to the north of the northwestern corner of the site; on April 11, 2019, no burrowing owls were observed. Previous surveys in 2011 and 2012 identified the closest known occurrence of burrowing owls to the site, which were within a half mile and within a mile to the south of the site in a canal. Currently, suitable habitat onsite consists mainly ground squirrel burrows within and along the canals onsite and adjacent to the site as well as man-made 'burrows', such as pipes. The site provides suitable nesting/burrow habitat in the form of California ground squirrel burrows along the edges of the agricultural fields and in and along the canals, and in the form of pipes in or on the ground, as well as foraging habitat within the agricultural fields for burrowing owls. Canal maintenance activities have the potential to impact locations of burrowing owls, as many large canals support burrowing owls, such as the canal south of Laurel Avenue, where several burrowing owls were identified in previous surveys in the area. In between maintenance activities and recolonization, the burrowing owls would take up temporary residence elsewhere.

An assessment of potential impacts to habitat for the burrowing owl was constructed for the WSP Master Plan and Grape Solar study areas (see Appendix D). The site-specific analysis of the Grape Solar study area concluded that within the Grape Solar project site, LOA identified 423.4 acres of habitat suitable for burrowing owls year-round, 953 acres suitable seasonally, and 353.4 acres of unsuitable habitat. Within two miles of the Grape Solar project site, and outside areas to be impacted by other solar development, LOA identified 1,472.6 acres of habitat suitable for burrowing owls year-round, 2,725.1 acres suitable seasonally, and 2,789.6 acres of unsuitable habitat. Therefore, for this site, it was found that adequate suitable foraging habitat exists outside of the WSP Plan Area near most of the documented burrowing owl locations, which should be able to support these owls. Therefore, significant impacts to burrowing owl habitat is not expected to occur for the Grape Solar project site.

However, ground disturbance from project construction may also result in the mortality of burrowing owls, as they are known to retreat into their burrows ahead of approaching grading activity. These small raptors are protected under the federal Migratory Bird Treaty Act and the California Fish and Game Code. Mortality of individual birds would be a violation of state and federal law. The mortality of individual burrowing owls and the loss of a large area of known breeding and foraging habitat would constitute a significant environmental impact.

Mitigation. Prior to the construction of the Project, the following measures shall be implemented which will reduce impacts to the burrowing owl to a less-than-significant level:

Mitigation Measure 3.3.7a (pre-construction surveys). Pre-construction surveys shall be conducted for burrowing owls by a qualified biologist no more than 14 days in advance of the on-set of ground-disturbing activity. Pre-construction surveys shall be repeated if construction halts for more than 14 days. These surveys shall be conducted according to methods described in the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012) or the most recent CDFW guidelines. The surveys shall cover all areas of suitable burrowing owl habitat within the construction zones.

Mitigation Measure 3.3.7b (Avoidance of active nests during breeding season). If pre-construction surveys are undertaken during the breeding season (February through August) and active nest burrows are located within or near construction zones, a construction-free buffer of 150 to 250 feet shall be established around all active owl nests as determined by the project biologist based on the level of construction activity and the tolerance of each nest. The buffer areas shall be enclosed with temporary fencing, and construction equipment and workers shall not be allowed to enter the enclosed setback areas. Buffers shall remain in place for the duration of the breeding season. After the breeding season (i.e., once all young have left the nest), passive relocation of any remaining owls may take place, but only under the conditions described below.

Mitigation Measure 3.3.7c (Avoidance of occupied burrows during non-breeding season, and passive relocation of resident owls). During the non-breeding season (September through January), any burrows occupied by resident owls in areas planned for construction shall be protected by a construction-free buffer with a radius of 150 feet around each active burrow. Passive relocation of resident owls is not recommended by CDFW where it can be avoided. If passive relocation is not avoidable, resident owls may be passively relocated according to a relocation plan prepared by a qualified biologist.

Mitigation Measure 3.3.7d (Tailgate Training). All construction workers shall attend tailgate training that includes a description of the species, a brief summary of their biology, and minimization measures and instructions on what to do if a burrowing owl is observed within or near a construction zone.

Compliance with the above mitigation measures would reduce impacts to burrowing owls to a less-than-significant level.

3.3.8 Impacts to Wildlife Movement Corridors

Potential Impacts. It is likely that some species use the canal and ditches on and adjacent to the Project Site as movement corridors, including San Joaquin kit fox. The Project Site likely has some small value for the regional movements of some wildlife species, however, the canal and ditch system has greater value when placed in a regional context. Since the development of the Grape Solar project would not affect existing canals, which would continue to be operated and managed as they are under current conditions, it is expected that wildlife that currently uses the canals for movement will continue to use the canal system to move through the site at project build-out.

To allow for ground movement of wildlife through the Project Site, all fencing enclosing the Grape Solar facility is planned to consist of "wildlife friendly" fencing with a continuous 5- to 7-inch separation from the top of the ground to the lowest point of the bottom of the fence along the entire fence. Such fencing will not be electrified.

Therefore, wildlife currently using the Project Site for movement is expected to continue to use the Project Site after buildout, as wildlife friendly fencing will be used and the canal system will be retained within the Project Site in order to allow for wildlife movement through the Project Site.

Impacts to movement corridors for local wildlife are less-than-significant.

Mitigations. Mitigation for impacts to wildlife movements is not warranted.

3.3.9 Disturbance to Native Wildlife Nursery Sites

Potential Impacts. The aquatic habitat associated with the irrigation canals and ditches within and adjacent to the Project Site could provide nursery sites for native wildlife. Since these features would be avoided by the Grape Solar project, the potential impacts to wildlife nursery sites would be less-than-significant.

Mitigation. No mitigation is warranted.

3.3.10 Disturbance to Waters of the United States, Waters of the State, and Riparian Habitats

Potential Impacts. Onsite waters, as contained in irrigation canals within and near the Grape Solar project site, appear not to meet the jurisdictional requirements of the USACE as Waters of the United States (see Section 2.7). However, only the USACE can make a jurisdictional determination. The construction of the Grape Solar project is not planned or expected to encroach upon or physically alter any onsite or off-site canals. The project will avoid all permanent canals.

However, should construction be planned to occur in areas that would result in the placement of fill in any canals, a wetland delineation may be required to determine the extent of USACE jurisdiction over such features. If the waters to be filled are determined to be Waters of the U.S. the following permits may be required 1) a Clean Water Act permit from the USACE, 2) a Water Quality Certification from the RWQCB, and/or 3) a Lake or Stream Alteration Agreement from the CDFW. These permits are usually issued on the condition that a mitigation plan be prepared and approved by the applicable state and federal regulatory agencies noted above. Because the solar project is planned to avoid potential Waters of the U.S. and riparian areas, potential impacts to Waters of the U.S. and riparian habitat would constitute a less-than-significant adverse impact under CEQA.

Mitigation. Potential impacts to Waters of the U.S., waters of the State, and riparian habitat would be avoided; therefore, no mitigation is warranted.

3.3.11 Local Policies or Habitat Conservation Plans

Potential Impacts. The Grape Solar project would be in compliance with the provisions of Kings County General Plan polices. In particular, the project's avoidance of onsite canals would assure that biological resources of concern to Kings County would be avoided and preserved.

The USFWS has adopted the *Recovery Plan for Upland Species of the San Joaquin Valley* (USFWS 1998) which covers 34 species of plants and animals that occur in the San Joaquin Valley. The majority of these species occur in arid grasslands and scrublands of the San Joaquin Valley and the adjacent foothills and valleys. The plan includes information on recovery criteria, habitat protection, umbrella and keystone species, monitoring and research program, adaptive management, and economic and social considerations. The only species addressed in the recovery plan that potentially occurs in the Project Site vicinity is the San Joaquin kit fox, although no sightings of this species have been recorded in the immediate vicinity of the Project Site and no sightings have been recorded in the vicinity since 2000, as discussed above. The Recovery Plan does not identify the Project Site or any other lands in the vicinity as areas that should be protected as Specialty Reserve Areas, Wildlife-Compatible Farmland to be Maintained, or Areas Where Connectivity and Linkages Should be Promoted.

The Project Site is not covered by any existing Habitat Conservation Plan (HCP) or Natural Community Conservation Plan (NCCP), or any other conservation plan adopted at the local, regional, state, or federal level.

Mitigation. No mitigations are warranted.

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APPENDIX A: VASCULAR PLANTS OF THE PROJECT SITE

The plants species listed below were observed on the site during the field surveys conducted by Live Oak Associates on January 22, 2020. The U.S. Fish and Wildlife Service wetland indicator status of each plant has been shown following its common name.

OBL - Obligate
FACW - Facultative Wetland
FAC - Facultative
FACU - Facultative Upland
UPL - Upland
+/- - Higher/lower end of category
NR - No review
NA - No agreement
NI - No investigation

ASTERACEAE - Sunflower Family		
*Lactuca serriola**	Prickly lettuce	FAC
*Sonchus asper**	Prickly sowthistle	UPL
BORAGINACEAE – Borage Family		
Amsinckia sp.	Fiddleneck	UPL
BRASSICACEAE – Mustard Family		
*Brassica rapa**	Common mustard	UPL
CHENOPODIACEAE – Goosefoot Family		
*Salsola tragus**	Russian thistle	UPL
MALVACEAE – Mallow Family		
Malvella leprosa	Alkali mallow	FACU
POACEAE - Grass Family		
*Triticum aestivum**	Common wheat	UPL
SALICACEAE – Willow Family		
Populus fremontii ssp. *Fremontii*	Fremont cottonwood	FACW

* Introduced non-native species

APPENDIX B: TERRESTRIAL VERTEBRATE SPECIES THAT POTENTIALLY OCCUR ON THE PROJECT SITE

The species listed below are those that may reasonably be expected to use the habitats of the project site routinely from time to time. The list was not intended to include birds that are vagrants or occasional transients. Terrestrial vertebrate species observed in or adjacent to the project site during surveys conducted by LOA ecologists on January 22, 2020 have been noted with an asterisk.

CLASS: AMPHIBIA (Amphibians)
ORDER: SALIENTIA (Frogs and Toads)
FAMILY: BUFONIDAE (True Toads)
Western Toad (*Bufo boreas*)
FAMILY: HYLIDAE (Treefrogs and relatives)
Pacific Chorus Frog (*Pseudacris regilla*)
FAMILY: RANIDAE (True Frogs)
Bullfrog (*Rana catesbeiana*)

CLASS: REPTILIA (Reptiles)
ORDER: TESTUDINES (Turtles)
FAMILY: EMYDIDAE (Box and Water Turtles)
Pond Slider (*Trachemys scripta*)
ORDER: SQUAMATA (Lizards and Snakes)
SUBORDER: SAURIA (Lizards)
FAMILY: PHRYNOSOMATIDAE
Side-blotched Lizard (*Uta stansburiana*)
FAMILY: TEIIDAE (Whiptails and relatives)
Western Whiptail (*Cnemidophorus tigris*)
SUBORDER: SERPENTES (Snakes)
FAMILY: COLUBRIDAE (Colubrids)
Coachwhip (*Masticophis flagellum*)
Glossy Snake (*Arizona elegans*)
Common Kingsnake (*Lampropeltis getulus*)
Long-nosed Snake (*Rhinocheilus lecontei*)
Common Garter Snake (*Thamnophis sirtalis*)
Gophersnake (*Pittuophis catenifer*)
FAMILY: VIPERIDAE (Vipers)
Western Rattlesnake (*Crotalus viridis*)

CLASS: AVES (Birds)
ORDER: CICONIIFORMES (Herons, Storks, Ibises and Relatives)
FAMILY: ARDEIDAE (Herons and Bitterns)
Great Blue Heron (*Ardea herodias*)
Black-crowned Night Heron (*Nycticorox nycticorax*)
Cattle Egret (*Bubulcus ibis*)

Great Egret (*Ardea alba*)
Snowy Egret (*Egretta thula*)
FAMILY: CATHARTIDAE (American Vultures)
Turkey Vulture (*Cathartes aura*)
ORDER: ANSERIFORMES (Screamers, Ducks and Relatives)
FAMILY: ANATIDAE (Swnas, Geese and Ducks)
Ring-necked Duck (*Aythya collaris*)
Bufflehead (*Bucephala albeola*)
Mallard (*Anas platyrhynchos*)
Northern Shoveler (*Anas clypeata*)
Cinnamon Teal (*Anas cyanoptera*)
Canvasback (*Aythya valisineria*)
Ruddy Duck (*Oxyura jamaicensis*)
Canada Goose (*Branta canadensis*)
ORDER: FALCONIFORMES (Vultures, Hawks, and Falcons)
FAMILY: ACCIPITRIDAE (Hawks, Old World Vultures, and Harriers)
White-tailed Kite (*Elanus leucurus*)
Northern Harrier (*Circus cyaneus*)
*Red-tailed Hawk (*Buteo jamaicensis*)
Ferruginous Hawk (*Buteo regalis*)
Sharp-Shinned Hawk (*Accipiter striatus*)
Cooper's Hawk (*Accipiter cooperii*)
Swainson's Hawk (*Buteo swainsoni*)
FAMILY: FALCONIDAE (Caracaras and Falcons)
American Kestrel (*Falco sparverius*)
Merlin (*Falco columbarius*)
ORDER: GRUIFORMES (Cranes, Rails and Relatives)
FAMILY: RALLIDAE (Rails, Gallinules and Coots)
Common Moorhen (*Gallinula galeata*)
American Coot (*Fulica Americana*)
ORDER: CHARADRIIFORMES (Shorebirds, Gulls, and relatives)
FAMILY: CHARADRIIDAE (Plovers and relatives)
Killdeer (*Charadrius vociferus*)
FAMILY: SCOLOPACIDAE (Sandpipers, Phalaropes, and Relatives)
Greater Yellowlegs (*Tringa melanoleuca*)
ORDER: COLUMBIFORMES (Pigeons and Doves)
FAMILY: COLUMBIDAE (Pigeons and Doves)
Rock Dove (*Columba livia*)
Mourning Dove (*Zenaida macroura*)
ORDER: STRIGIFORMES (Owls)
FAMILY: TYTONIDAE (Barn Owls)
Common Barn Owl (*Tyto alba*)
FAMILY: STRIGIDAE (Typical Owls)
Burrowing Owl (*Athene cunicularia*)
Great Horned Owl (*Bubo virginianus*)

Western Screech Owl (*Otus kennicottii*)

ORDER: APODIFORMES (Swifts and Hummingbirds)

FAMILY: TROCHILIDAE (Hummingbirds)

Black-chinned Hummingbird (*Archilochus alexandri*)
Anna's Hummingbird (*Calypte anna*)
Rufous Hummingbird (*Selasphorus rufus*)

ORDER: PICIFORMES (Woodpeckers and relatives)

FAMILY: PICIDAE (Woodpecker and Wrynecks)

Northern Flicker (*Colaptes chrysoides*)
Nuttall's Woodpecker (*Picoides nuttallii*)

ORDER: PASSERIFORMES (Perching Birds)

FAMILY: TYRANNIDAE (Tyrant Flycatchers)

Black Phoebe (*Sayornis nigricans*)
Say's Phoebe (*Sayornis saya*)
*Western Kingbird (*Tyrannus verticalis*)

FAMILY: LANIIDAE (Shrikes)

Loggerhead Shrike (*Lanius ludovicianus*)

FAMILY: CORVIDAE (Jays, Magpies, and Crows)

Western Scrub Jay (*Aphelocoma coerulescens*)
American Crow (*Corvus brachyrhynchos*)
Common Raven (*Corvus corax*)

FAMILY: ALAUDIDAE (Larks)

Horned Lark (*Eremophila alpestris*)

FAMILY: HIRUNDINIDAE (Swallows)

Cliff Swallow (*Hirundo pyrrhonota*)
Barn Swallow (*Hirundo rustica*)

FAMILY: TURDIDAE

American Robin (*Turdus migratorius*)

FAMILY: MIMIDAE (Mockingbirds and Thrashers)

Northern Mockingbird (*Mimus polyglottos*)

FAMILY: STURNIDAE (Starlings)

European Starling (*Sturnus vulgaris*)

FAMILY: MOTACILLIDAE (Wagtails and Pipits)

American Pipit (*Anthus rubescens*)

FAMILY: BOMBYCILLIDAE (Waxwings)

Cedar Waxwing (*Bombycilla cedrorum*)

FAMILY: PARULIDAE (Wood Warblers and Relatives)

Yellow-rumped Warbler (*Dendroica coronata*)

FAMILY: EMBERIZIDAE (Wood Warblers, Sparrows, Blackbirds, and relatives)

*Song Sparrow (*Melospiza melodia*)
Savannah Sparrow (*Passerculus sandwichensis*)
White-crowned Sparrow (*Zonotrichia leucophrys*)

FAMILY: ICTERIDAE (Blackbirds, Orioles and Allies)

Red-winged Blackbird (*Agelaius phoeniceus*)
Tricolored Blackbird (*Agelaius tricolor*)

*Western Meadowlark (*Sturnella neglecta*)
Brewer's Blackbird (*Euphagus cyanocephalus*)
Brown-headed Cowbird (*Molothrus ater*)
FAMILY: PASSERIDAE (Old World Sparrows)
House Finch (*Carpodacus mexicanus*)
House Sparrow (*Passer domesticus*)

CLASS: MAMMALIA (Mammals)
ORDER: DIDELPHIMORPHIA (Marsupials)
FAMILY: DIDELPHIDAE (Opossums)
Virginia Opossum (*Didelphis virginiana*)
ORDER: INSECTIVORA (Insectivores)
Ornate Shrew (*Sorex ornatus*)
ORDER: CHIROPTERA (Bats)
FAMILY: PHYLLOSTOMIDAE (Leaf-nosed Bats)
Southern Long-nosed Bat (*Leptonycteris curasoae*)
FAMILY: VESPERTILIONIDAE (Evening Bats)
Yuma Myotis (*Myotis yumanensis*)
California Myotis (*Myotis californicus*)
Pale Big-eared Bat (*Corynorhinus townsendii pallescens*)
Townsend's Western Big-eared Bat (*Corynorhinus townsendii townsendii*)
Western Pipistrelle (*Pipistrellus hesperus*)
Big Brown Bat (*Eptesicus fuscus*)
Pallid Bat (*Antrozous pallidus*)
FAMILY: MOLOSSIDAE (Free-tailed Bat)
California Mastiff Bat (*Eumops perotis* ssp. *californicus*)
Brazilian Free-tailed Bat (*Tadarida brasiliensis*)
ORDER: LAGOMORPHA (Rabbits, Hares, and Pikas)
FAMILY: LEPORIDAE (Rabbits and Hares)
Desert Cottontail (*Sylvilagus audubonii*)
Black-tailed (Hare) Jackrabbit (*Lepus californicus*)
ORDER: RODENTIA (Rodents)
FAMILY: SCIURIDAE (Squirrels, Chipmunks, and Marmots)
*California Ground Squirrel (*Spermophilus beecheyi*)
FAMILY: GEOMYIDAE (Pocket Gophers)
*Botta's Pocket Gopher (*Thomomys bottae*)
FAMILY: MURIDAE (Old World Rats and Mice)
Western Harvest Mouse (*Reithrodontomys megalotis*)
Deer Mouse (*Peromyscus maniculatus*)
Norway Rat (*Rattus norvegicus*)
House Mouse (*Mus musculus*)
California Vole (*Microtus californicus*)
ORDER: CARNIVORA (Carnivores)
FAMILY: CANIDAE (Foxes, Wolves, and relatives)
Coyote (*Canis latrans*)

Gray Fox (*Urocyon cinereoargenteus*)

FAMILY: PROCYONIDAE (Raccoons and relatives)

Raccoon (*Procyon lotor*)

FAMILY: MEPHITIDAE (Skunks)

Striped Skunk (*Mephitis mephitis*)

FAMILY: FELIDAE (Cats)

Bobcat (*Lynx rufus*)

Feral Cat (*Felis domesticus*)

APPENDIX C: CUMULATIVE IMPACT ANALYSIS FOR POTENTIAL IMPACTS TO SWAINSON'S HAWK FORAGING HABITAT IN THE VICINITY OF THE GRAPE SOLAR PROJECT SITE

The purpose of this study is to provide information to complete the Cumulative Impacts Assessment for the project in support of Section 15130 of the California Environmental Quality Act (CEQA) Guidelines. These guidelines require that cumulative impacts of a project are discussed when a project's incremental effects are cumulatively considerable (15065(a)(3)). A cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts (15355). CEQA guidelines define cumulatively considerable as follows: "the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probably future projects."

In accordance with CEQA Guidelines, the following discussion of cumulative impacts reflects the standards of practicality and reasonableness, and focuses on the cumulative impact to which the identified other projects contribute to the cumulative impact. A list of past, present, and probable future projects producing related or cumulative impacts was provided by Bert Verrips and the County of Kings in January 2020. (Bert Verrips, personal communication, January 9, 2020).

This analysis focuses on the project's possible cumulative effects on the Swainson's hawk (SWHA) (*Buteo swainsonii*), a California threatened species that relies largely on agricultural lands to meet its foraging needs. The objectives of this study include using available data to:

1) Identify past, current and probable future projects for cumulative impacts assessment.
2) Determine distribution and abundance of nesting Swainson's hawk in the Study Area.
3) Determine foraging habitat requirements in the Study Area.
4) Assess the cumulative impacts of the proposed Westlands Solar Park (WSP) on the distribution and abundance of foraging habitat.

INCORPORATION BY REFERENCE OF ANALYSIS FROM WSP PROGRAM EIR

This biological report constitutes a technical report for the MND on the Grape Solar Project. Since the MND is a subsequent CEQA document that is being tiered off the Program EIR (PEIR) for the WSP Master Plan and Gen-Tie Corridors Plan, the biological analysis in the PEIR applies to the

MND and this biological report, and is incorporated into them by reference. As such, the analysis and conclusions of the Program EIR with respect to cumulative impacts to foraging habitat resulting from WSP development, together with other projects within a 10-mile radius of the WSP Master Plan area, are fully applicable to the Grape Solar Project which constitutes an individual project element of the WSP Master Plan.

STUDY AREA

For this study the study area, or geographic scope, assessed for the cumulative impact is defined by a 10-mile radius surrounding the approved WSP Master Plan area, which covers approximately 21,000-acres. This radius was selected because published studies have identified this radius as the flight distance between active nests sites and suitable foraging habitats (Estep 1989, Babcock 1995). The area encompassed by the 10-mile radius is 443,207 acres (approximately 692 square miles).

The WSP Master Plan area is located in the center of the study area approximately nine miles southwest of the City of Lemoore, CA. The entire WSP Master Plan area consists of cultivated fields, fallow fields/pastures, agricultural roads, and irrigation canals and ditches.

The cities of Lemoore, Huron, and Avenal, and the communities of Stratford and Kettleman City, as well as the Naval Air Station Lemoore are located entirely within the 10-mile radius study area. The surrounding lands are similar to the Grape Solar Project site with fallow/idle cropland, active agricultural fields, and grass/pasture dominating the landscape (USDA 2018).

A few natural features are located within the study area. Natural Resource Conservation Service Wetlands Reserve Program land is located approximately 5 miles to the northeast of the WSP Master Plan area and the Arroyo Pasajero Westside Detention Basin is located approximately 5 miles to the west of the WSP Master Plan area, which contain more natural habitats and may be subject to flooding. Bureau of Land Management Areas of Critical Environmental Concern are located approximately 4 miles west and southwest of the site. Portions of the North Fork, South Fork and Clarke Fork of the Kings River are present within the study area, most of which contain riparian habitat and more natural riverine features. Irrigation canals and ditches are also located throughout the study area.

PROPOSED AND APPROVED PROJECTS WITHIN THE STUDY AREA

As of January 2020, 21 solar projects located outside the Westlands Solar Park Plan Area were identified within the study area for this cumulative impact assessment. Acreages for these solar projects were calculated using aerial imagery and information obtained from Kings and Fresno Counties. Projects within Kings County include the Sun City (180 acres); Sand Drag (240 acres); Avenal Park (86 acres); American Kings (978 acres); Riverwest (836 acres); Kansas South (230 acres); Kansas (200 acres); Mustang (1,422 acres); Orion (200 acres); Kent South (200 acres); Kettleman Solar (220 acres); Lemoore 14 (60 acres); 2275 Hattesen (16 acres); Java Solar (96 acres); Mustang 2 (1,450 acres); Slate (2,490 acres); and NAS Lemoore Solar (930 acres). Projects within Fresno County include and PG&E Huron (~240 acres); PG&E Gates (57 acres); Westlands Solar Farm (92 acres); and EC&R Solar (1,605 acres). These 21 projects together encompass approximately 11,828 acres of the study area. With the addition of the planned WSP solar development (20,938 acres, which includes the Grape Solar Project), the total area covered by the cumulative projects is approximately 32,766 acres. For the purpose of this analysis, this total acreage amount conservatively assumes that all the cumulative development acreage constitutes suitable SWHA foraging habitat.

METHODS

In order to assess SWHA foraging habitat all known active nests or historically active nests were recorded within the study area. The total population in the study area was determined querying the California Natural Diversity Database (CNDDB) (CDFW 2020) for observations recorded in 2017 in addition to using data from project field surveys conducted by Live Oak Associates (LOA) and Estep in 2017 (Estep 2017). All nests identified in 2017 from the CNDDB, LOA, and Estep records are assumed to be active for the purpose of this analysis.

Foraging Habitats

Land uses and habitat types were identified using the 2017 United States Department of Agriculture (USDA) National Agricultural Statistics Service Cropland Data Layer (CDL) (USDA 2018; Han et al. 2012; Boryan et al. 2011). The CDL is a raster, geo-referenced, crop-specific land cover data layer created annually for the continental United States using moderate resolution satellite imagery and extensive agricultural ground truthing (USDA 2018). For the purposes of this study, the CDL layer was limited to the study area which included 58 cover types.

Foraging habitat associations were based on 6 cover type categories, instead of the 58 specific cover types identified in the 2017 CDL because agricultural crop management is a dynamic process; crop types may change annually and seasonally. These were used to characterize relative foraging habitat suitability on the landscape (Estep 2012). The six land use/cover type categories used for the Study Area include:

- Alfalfa
- Irrigated Cropland
- Orchard/Vineyard
- Developed/Open Water
- Pasture/Barren
- Natural woodlands

Foraging habitat classes were based on Biology, Movements, and Habitat Relationships of the Swainson's Hawk in the Central Valley of California (Estep 1989) and California Partners in Flight Riparian Bird Conservation Plan: Swainson's Hawk (Buteo swainsoni) (Woodbridge 1998). Based on these documents, alfalfa, irrigated cropland, and pasture/barren, were determined to constitute suitable foraging habitat for the Swainson's hawk.

Data Preparation

Habitat and land use cover type acreages were calculated using a built-in map calculator. The study area includes roads and highways which are not classified habitat types in the CDL; therefore, acreages may minimally exceed the actual acreage for any given class. For the purposes of this study, this effect is considered negligible because it accounts for a very small percentage of the study area and does not affect habitat distribution and abundance.

RESULTS

Nest Proximity

A total of 37 SWHA nests were documented within the study area from surveys completed by LOA, Estep, and others in 2017 (see Figure 1), and this analysis assumes all 37 nests would be occupied in any given year considering the generally high degree of nest fidelity by Swainson's hawks. The nearest SWHA nest is approximately 120 feet east of the southern tip of the WSP Master Plan area along the Blakeley Canal and 11 other nests are within five miles of the WSP Master Plan area. Twenty-five SWHA nests are between five and ten miles of the WSP Master Plan area.

Land Use Cover Types

There are six cover type categories in the 443,207-acre study area and five cover type categories in the WSP Master Plan area. Relative abundance for each cover type category and their SWHA forage value is listed Table 1 and described below.

Table 1. Land Cover Type Acreage and Percent Total of WSP Study Area and Project Site (USDA 2018).

Land Cover Type Category	SWHA Forage Value	Study Area Acres (Percent of Total)	WSP Project Site Acres (Percent of Total)
Alfalfa	High	13,033.2 (2.94%)	338.9 (1.63%)
Pasture/Barren	Medium-High	119,462 (26.95%)	2,789.7 (13.46%)
Irrigated Cropland	Medium	174,860.6 (39.45%)	12,906.1 (62.26%)
Orchard/Vineyard	Low-None	104,588.2 (23.6%)	4,22636 (20.39%)
Developed/Open Water	None	31,207.9 (7.04%)	467.4 (2.25%)
Natural and Non-Native Forest	None	55.3 (0.01%)	0 (0%)
Total		443,207.2 (100%)	20,728.7 (100%)

Alfalfa. Alfalfa is considered to have the highest foraging value for SWHA (Estep 1989, 2012). This crop remains in fields for up to 5 years. Alfalfa management includes mowing and irrigation which can expose rodent prey and make prey more accessible to SWHA (Estep 2012).

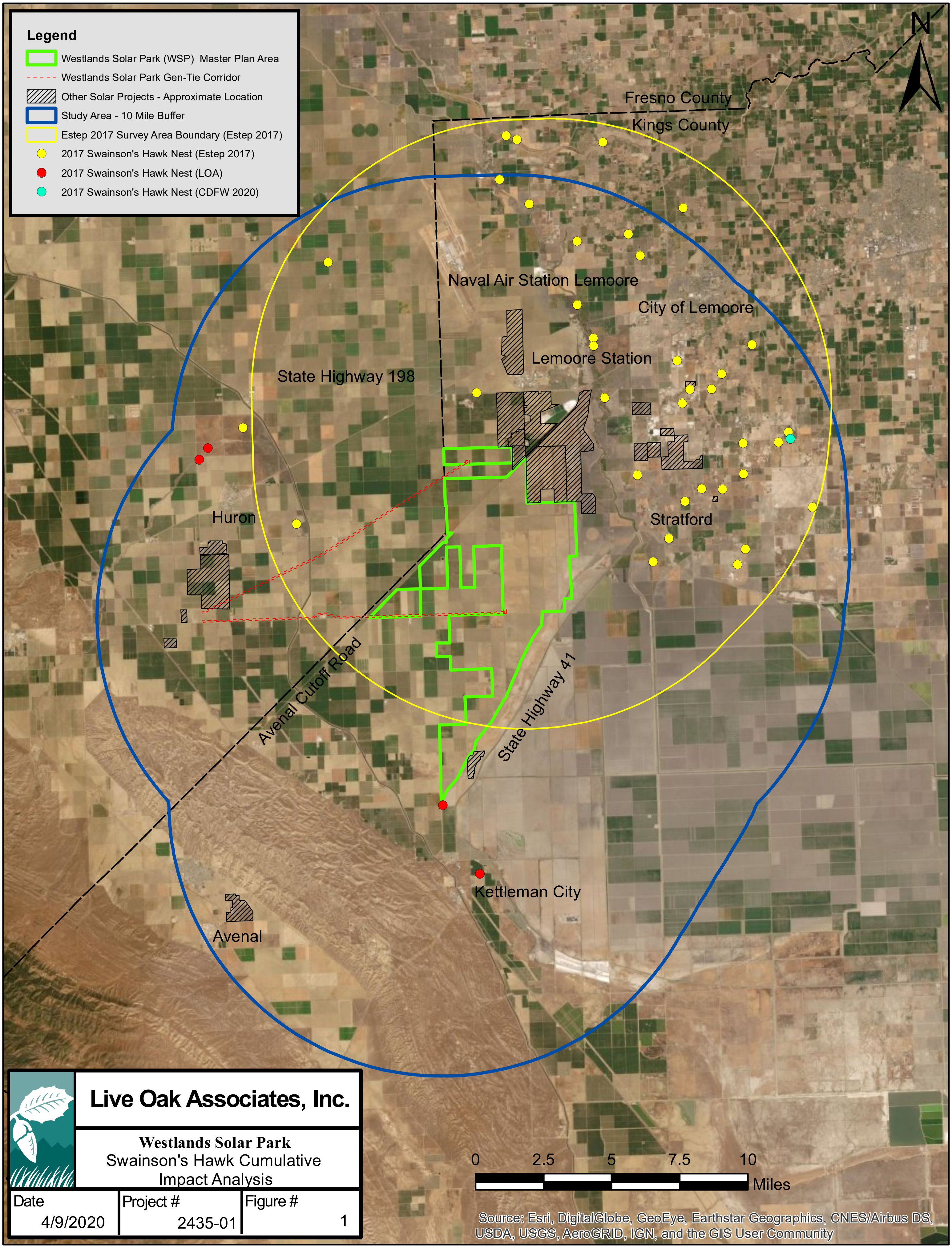
Pasture/Barren. This cover type category includes barren, fallow/idle cropland, grass/pasture, herbaceous wetlands, and shrubland. Other grassland surrogates such as herbs are also included in this category. Fallow/idle croplands represent the majority of this cover type. This cover type may provide medium to high forage value to SWHA depending upon prey availability.

Irrigated Cropland. The majority of this cover type category includes crops such as cotton, tomatoes, winter wheat. Other crops include barley, cantaloupes, carrots, corn, dry beans, durum wheat, garlic, honeydew melons, lettuce, oats, onions, other crops, other hay/non-alfalfa, peppers, rice, rye, safflower, sod/grass seed, sorghum, spring wheat, triticale, and watermelons are also included; however, these represent a very small percentage of the total. This cover type may provide medium foraging habitat value to SWHA (Estep 1989). Foraging value for this type may be dependent upon timing of harvest and planting.

Orchard/Vineyards. This cover type category includes almonds, cherries, citrus, grapes, nectarines, oranges, other tree crops, peaches, pecans, pistachios, plums, pomegranates, and walnuts, and represents little to no foraging value to SWHA due to a lack of accessibility for SWHA (Woodbridge 1998). Due to the little to no foraging value, this habitat is not included as foraging habitat for this analysis.

Developed/Open Water. This cover type category represents developed areas with low, moderate and high intensities such as the towns of Avenal, Huron, Kettleman City, Lemoore, Lemoore Station, Naval Air Station Lemoore, and Stratford and rural developments (e.g., cattle corrals and other infrastructure). This cover type contributes no forage value, however trees located on these properties may provide nesting habitat. Open water also represents no forage value to SWHA. A small percentage of the open water mapped in the CDL may be flooded fields, a temporary feature. Therefore, this cover type may be overrepresented; however, this effect is considered negligible in comparison to the overall Study Area.

Natural and Non-Native Forest. This cover type category is represented by evergreen forest, mixed forest, and woody wetlands. These areas may provide nesting habitat for SWHA; however, they provide no forage habitat value for SWHA.



Live Oak Associates, Inc.

Westlands Solar Park
Swainson's Hawk Cumulative Impact Analysis

Date	Project #	Figure #
4/9/2020	2435-01	1

Foraging Habitat Cumulative Analysis

Estep (1989, 2012) has proposed that if a cumulative loss of agricultural foraging habitat, from the proposed project and other projects, results in a reduction of surplus habitat to less than 70% relative to pre-project conditions, then the cumulative impact is deemed significant. Surplus habitat represents the number of available foraging acres that exceed the minimum required available foraging acres to support known Swainson's hawk nesting pairs. The significance threshold is derived from reviewing habitat land cover data to estimate the existing foraging habitat baseline condition and including the existing Swainson's hawk population foraging habitat requirements to estimate the required foraging habitat necessary to support the nesting population (Estep 1989, 2012). This methodology is used for this study.

Estep (1989) calculated that an area of 6,820 acres of foraging habitat is required for each nesting pair. The total foraging habitat acreage required for the nesting population is calculated by multiplying the number of pairs in the study area by 6,820 acres. Table 2 presents the study area analysis for foraging habitat requirements for 37 pairs located in the Study Area.

Table 2. Cumulative impact analysis for SWHA foraging habitat within the Study Area

Foraging Habitat	**Acres**	**Percent**
(a) Available Foraging Habitat within Study Area	307,356	-
(b) Unadjusted Foraging Habitat required to support 37 SWHA pairs	252,340	82.1%
(c) Adjusted Foraging habitat required to support 37 SWHA pairs (adjusted for 30% range overlap)	176,638	57.5%
(d) Surplus SWHA foraging habitat (a-c)	130,718	42.5
(e) Cumulative impact of development of WSP Master Plan area and 22 other solar projects (on foraging habitat)*	32,766	10.7%
(f) Remaining available foraging habitat following cumulative impacts (a-e)	274,590	89.3%
(g) Remaining available surplus SWHA foraging habitat following cumulative impacts (d-e)	97,952	74.9%

*This conservatively assumes that all of the cumulative development acreage constitutes suitable SWHA foraging habitat.

Cumulative analysis for foraging habitat shows that there is a greater amount of foraging habitat available than that required to support 37 nesting pairs. Following Estep (2012), the total foraging habitat required was adjusted down to account for foraging habitat overlap within the Study Area. Estep (2012) considers the availability of the surplus foraging habitat acres in addition to the required foraging habitat to be sufficient to support a growing population. If available foraging habitat required to sustain the nesting population plus at least 70% (i.e. 97,952 acres) of the existing surplus habitat remains, the habitat removal resulting from the project and the other projects in the study area is not expected to significantly affect either the existing population or substantially affect opportunities for future population expansion. Therefore, the cumulative impacts would be considered less-than-significant.

There are currently 21 pending, approved, or constructed solar projects within the study area (including the WSP Master Plan area) with a total area of approximately 32,766 acres. Table 2 shows that the impact areas of the proposed WSP project and the 21 other solar projects do not reach or go below the 70% threshold of significance (91,503 acres) as defined by Estep (2012). The remaining available surplus habitat (97,952 acres) exceeds the 70% threshold of significance. Therefore, the cumulative impact to Swainson's hawk foraging habitat is less-than-significant.

APPENDIX D: BURROWING OWL ANALYSIS FOR THE WSP MASTER PLAN AREA AND GRAPE SOLAR PROJECT SITE

METHODS

2017 cropland data (USDA 2018) was used to prepare a map of potentially suitable habitat for burrowing owls within the WSP Master Plan and Grape Solar study areas. Crops were categorized into the following four categories according to their suitability to support burrowing owl burrow and foraging habitat (USDA 2018):

1) *Fallow/Pasture/Barren/Shrubland - Year-Round Forage and Burrow Habitat.* Potentially suitable crop/habitat types to support burrowing owl forage and burrow habitat year-round as identified in the cropland data may include types such as barren, fallow/idle cropland, grass/pasture, and shrubland.
2) *Irrigated Field - Seasonal Forage Habitat.* Potentially suitable crop/habitat types to support burrowing owl seasonal forage habitat may include alfalfa, barley, cantaloupes, carrots, corn, cotton, double crop barley/corn, double crop winter wheat/corn, double crop winter wheat/sorghum, dry beans, garlic, herbs, honeydew melons, lettuce, oats, onions, other crops, other hay/non-alfalfa, safflower, sod/grass seed, sorghum, spring wheat, tomatoes, triticale, watermelons, winter wheat, and other irrigated field types.
3) *Developed/Road - Year-Round Burrow Habitat.* As this category within the WSP Master Plan area is limited to roadways, this category also provides year-round burrow habitat, as burrowing owls are known to use roadsides for burrow habitat; these habitat types may include developed/high intensity, developed/low intensity, developed/medium intensity, and developed/open space.
4) *Orchard/Vineyard/Wetland - No Forage or Burrow Habitat*. This category includes almonds, cherries, grapes, herbaceous wetlands, open water, pecans, pistachios, pomegranates, walnuts, and woody wetlands.

The acreages of each habitat type were then calculated within each of the study areas, which included the site and two miles within each site.

RESULTS

Within the WSP Master Plan area, LOA identified 3,255.8 acres (15.70 % of Plan Area) of habitat suitable for burrowing owls year-round, 13,245 acres (63.90 % of Plan Area) suitable seasonally, and 4,227.9 acres (20.40 % of Plan Area) of unsuitable habitat (Table 1; Figure 1).

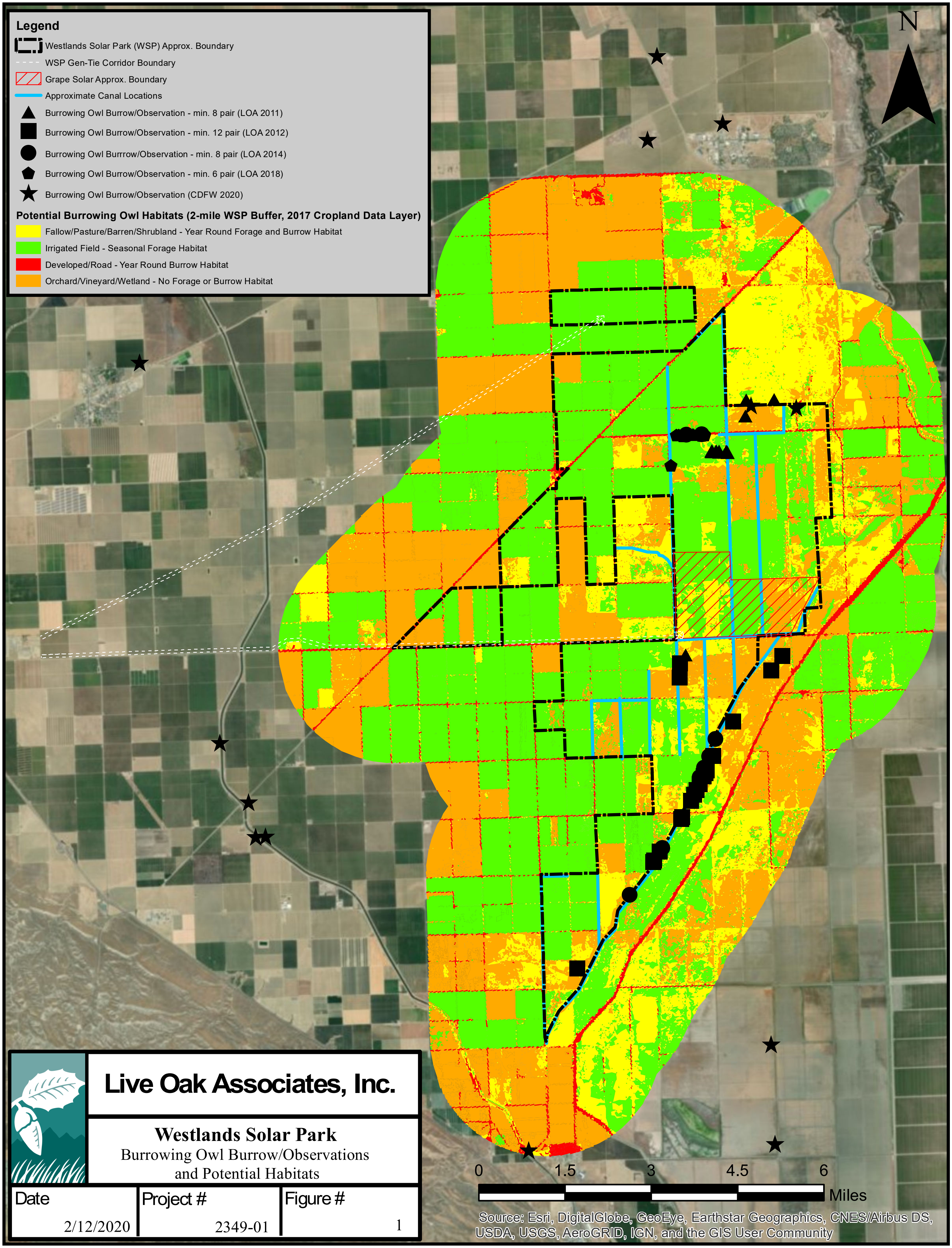
Table 1. Land Cover Type Acreage and Percent Total of WSP Master Plan Area and a 2-mile Buffer (USDA 2018)

Habitat Type	Habitat Value for BUOW	WSP Plan Area Acres (Percent of Total)	WSP Plan Area and a 2-mile Buffer Acres (Percent of Total)
Fallow/Pasture/Barren/Shrubland	Year-round forage and burrow habitat	2,789.7 (13.46%)	13,054.4 (16.21%)
Irrigated Field	Seasonal forage habitat	13,245.0 (63.90%)	38,197.0 (47.44%)
Developed/Road	Year-round burrow habitat	466.1 (2.25%)	2,882.7 (3.58%)
Orchard/Vineyard/Wetland	No forage or burrow habitat	4,227.9 (20.40%)	26,380.7 (32.77%)
Total		20,728.7 (100%)	80,514.8 (100%)

Within the Grape Solar project site, LOA identified 423.4 acres of habitat suitable for burrowing owls year-round, 953 acres suitable seasonally, and 353.4 acres of unsuitable habitat (Table 2). Within two miles of the Grape Solar project site LOA identified 2,441.7 acres of habitat suitable for burrowing owls year-round, 3,244.8 acres suitable seasonally, and 3,430.1 acres of unsuitable habitat (Table 2; Figure 2). No other solar sites are currently proposed within two miles of the site.

Table 2. Land Cover Type Acreage of Grape Solar and within Areas Not to be Impacted by WSP or Other Solar Projects within 2-Miles of Grape Solar (USDA 2018)

Habitat Type	Habitat Value for BUOW	Grape Solar Acres	Acres Not to be Impacted by WSP or Other Solar Projects within 2 Miles of Grape Solar
Fallow/Pasture/Barren/Shrubland	Year-round forage and burrow habitat	419.2	1,997.3
Irrigated Field	Seasonal forage habitat	953.0	3,244.8
Developed/Road	Year-round burrow habitat	4.2	444.4
Orchard/Vineyard/Wetland	No forage or burrow habitat	353.4	3,430.1
Total		1,729.8	9,116.6


Legend
Westlands Solar Park (WSP) Approx. Boundary
WSP Gen-Tie Corridor Boundary
Grape Solar Approx. Boundary
Approximate Canal Locations
Burrowing Owl Burrow/Observation - min. 8 pair (LOA 2011)
Burrowing Owl Burrow/Observation - min. 12 pair (LOA 2012)
Burrowing Owl Burrrow/Observation - min. 8 pair (LOA 2014)
Burrowing Owl Burrow/Observation - min. 6 pair (LOA 2018)
Burrowing Owl Burrow/Observation (CDFW 2020)
Potential Burrowing Owl Habitats (2-mile WSP Buffer, 2017 Cropland Data Layer)
Fallow/Pasture/Barren/Shrubland - Year Round Forage and Burrow Habitat
Irrigated Field - Seasonal Forage Habitat
Developed/Road - Year Round Burrow Habitat
Orchard/Vineyard/Wetland - No Forage or Burrow Habitat
N
0 1.5 3 4.5 6
Miles
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Live Oak Associates, Inc.
Westlands Solar Park
Burrowing Owl Burrow/Observations
and Potential Habitats
Date
2/12/2020
Project #
2349-01
Figure #
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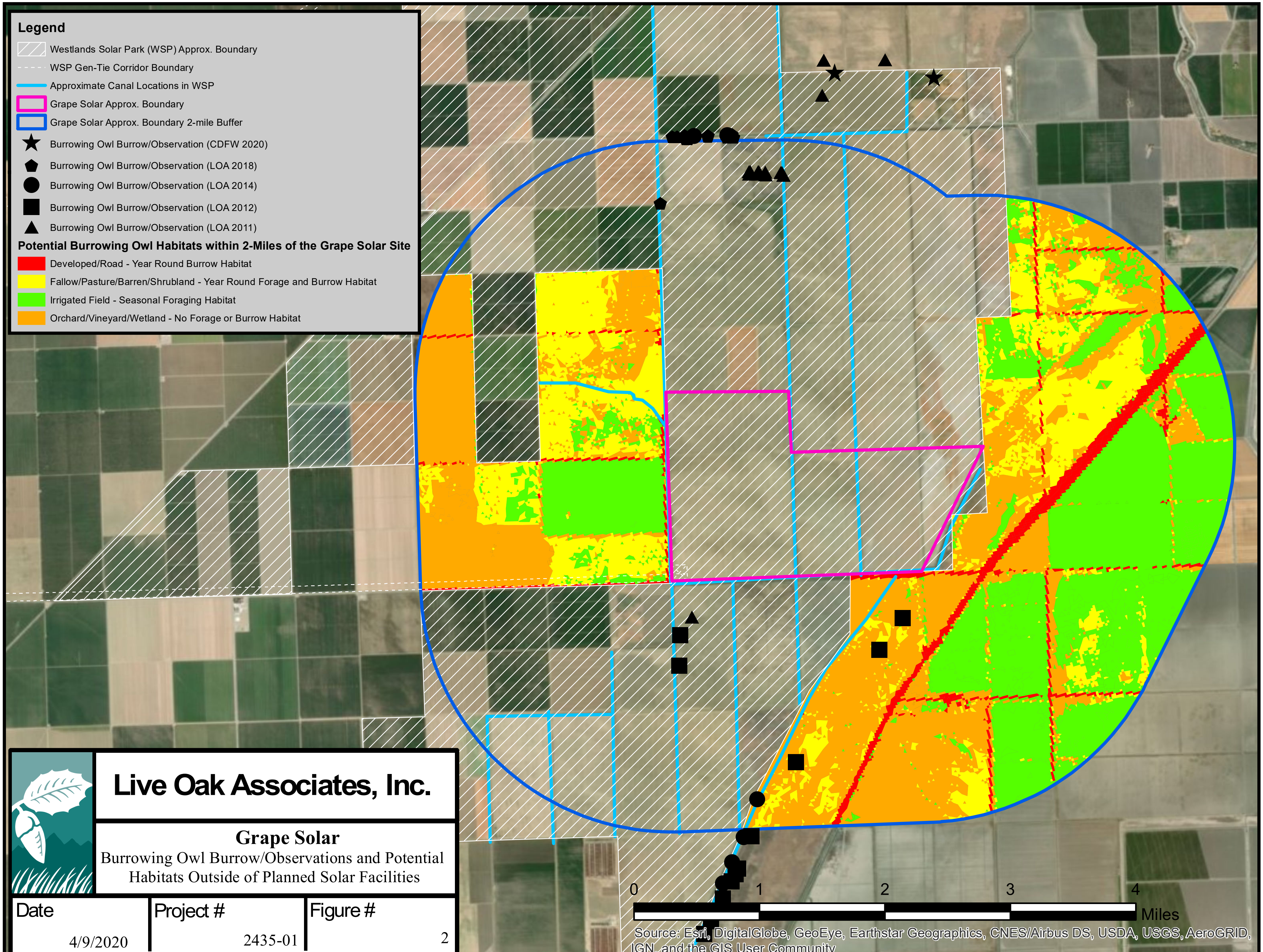

Live Oak Associates, Inc.

Grape Solar

Burrowing Owl Burrow/Observations and Potential Habitats Outside of Planned Solar Facilities

Date	Project #	Figure #
4/9/2020	2435-01	2

DISCUSSION

The development of WSP solar projects, including Grape Solar, could result in the loss of foraging and breeding habitat for burrowing owls. Known locations of burrowing owl burrows along canals will be avoided, as the projects will not be impacting the canals, and the canals will continue to be managed as they are currently managed, which will also benefit other species using the canal system to move through the WSP Plan Area. The majority of burrowing owls observed were along the eastern edge and northeast boundaries of the WSP Plan Area. Adequate suitable foraging habitat exists outside of the WSP Plan Area near most of these locations, which should be able to support these owls. For any burrowing owls occurring within the WSP Plan Area but outside the canal systems, both breeding and foraging habitat could be lost; this would constitute a significant impact to burrowing owl foraging and breeding habitat.

APPENDIX C

Noise and Vibration Assessment

Prepared by

Illingworth & Rodkin

February 2021

GRAPE SOLAR PROJECT
NOISE AND VIBRATION ASSESSMENT

Kings County, California

February 18, 2021

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I&R Project: 19-200

INTRODUCTION

This report assesses the potential significance of noise and vibration impacts resulting from the Grape Solar Project proposed in Kings County, California. The Project will occupy an approximately 1,759-acre site located on the north side of Nevada Avenue, approximately one-half mile west of SR-41.

The project is planned to generate a total of 250 megawatts (MW) of electrical output from solar photovoltaic (PV) modules, and is planned to be constructed over a 14-month period commencing in 2022, with completion scheduled for 2023. The solar modules will be mounted on a series of horizontal single-axis trackers which will be oriented north-south and rotate the solar arrays in an east-west direction. The solar modules output direct current (DC) power and the electricity travels to an inverter via underground cables to be converted to alternating current (AC) power.

The Setting Section of this report presents the fundamentals of environmental noise and vibration, provides a discussion of policies and standards applicable to the project, and presents the results of the ambient noise monitoring survey made at residential receptors in the project vicinity. The Impacts and Mitigation Measures section of the report summarizes the significance criteria used in the assessment of impacts, future noise and vibration levels expected from the construction and operation of the project, and the significance determinations of project-related noise and vibration impacts.

SETTING

Fundamentals of Environmental Noise

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its *loudness*. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. A *decibel (dB)* is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 1.

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level (dBA).* This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This *energy-equivalent sound/noise descriptor* is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Community Noise Equivalent Level* (*CNEL*) is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 p.m. - 10:00 p.m.) and a 10 dB addition to nocturnal (10:00 p.m. - 7:00 a.m.) noise levels. The *Day/Night Average Sound Level* (L_{dn} or *DNL*) is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

Effects of Noise

Sleep and Speech Interference

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noises of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA L_{dn}. Typically, the highest steady traffic noise level during the daytime is about equal to the L_{dn} and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses. Typical structural attenuation is 12-17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Sleep and speech interference is therefore possible when exterior noise levels are about 57-62 dBA L_{dn} with open windows and 65-70 dBA L_{dn} if the windows are closed. Levels of 55-60 dBA are common along collector streets and secondary arterials, while 65-70 dBA is a typical value for a primary/major arterial. Levels of 75-80 dBA are normal noise levels at the first row of development outside a freeway right-of-way. In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways need to be able to have their windows closed; those facing major roadways and freeways typically need special glass windows.

Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that the causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 50 dBA L_{dn}. At a L_{dn} of about 60 dBA, approximately 12 percent of the population is highly annoyed. When the L_{dn} increases to 70 dBA, the percentage of the population highly annoyed increases to about 25-30 percent of the population. There is, therefore, an increase of about 2 percent per dBA between a L_{dn} of 60-70 dBA. Between a L_{dn} of 70-80 dBA, each decibel increase increases the percentage of the population highly annoyed by about 3 percent. People appear to respond more adversely to aircraft noise. When the L_{dn} is 60 dBA, approximately 30-35 percent of the population is believed to be highly annoyed. Each decibel increase to 70 dBA adds about 3 percentage points to the number of people highly annoyed. Above 70 dBA, each decibel increase results in about a 4 percent increase in the percentage of the population highly annoyed.

Fundamentals of Groundborne Vibration

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One method is the Peak Particle Velocity (PPV). The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. In this report, a PPV descriptor with units of mm/sec or in/sec is used to evaluate construction generated vibration for building damage and human complaints. Table 3 displays the reactions of people and the effects on buildings that continuous or frequent intermittent vibration levels produce. The guidelines in Table 3 represent syntheses of vibration criteria for human response and potential damage to buildings resulting from construction vibration.

Construction activities can cause vibration that varies in intensity depending on several factors. The use of pile driving and vibratory compaction equipment typically generates the highest construction related groundborne vibration levels. Because of the impulsive nature of such activities, the use of the PPV descriptor has been routinely used to measure and assess groundborne vibration and almost exclusively to assess the potential of vibration to cause damage and the degree of annoyance for humans.

The two primary concerns with construction-induced vibration, the potential to damage a structure and the potential to interfere with the enjoyment of life, are evaluated against different vibration limits. Human perception to vibration varies with the individual and is a function of physical setting and the type of vibration. Persons exposed to elevated ambient vibration levels, such as people in an urban environment, may tolerate a higher vibration level.

Structural damage can be classified as cosmetic only, such as paint flaking or minimal extension of cracks in building surfaces; minor, including limited surface cracking; or major, that may threaten the structural integrity of the building. Safe vibration limits that can be applied to assess the potential for damaging a structure vary by researcher. The damage criteria presented in Table 3 include several categories for ancient, fragile, and historic structures, the types of structures most at risk to damage. Most buildings are included within the categories ranging from “Historic and some old buildings” to “Modern industrial/commercial buildings.” Construction-induced vibration that can be detrimental to the building is very rare and has only been observed in instances where the structure is at a high state of disrepair and the construction activity occurs immediately adjacent to the structure.

The annoyance levels shown in Table 3 should be interpreted with care since vibration may be found to be annoying at lower levels than those shown, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage.

TABLE 1 Definition of Acoustical Terms Used in this Report

Term	Definition
Decibel, dB	A unit describing, the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20 micro Pascals.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e. g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 p.m. and 7:00 a.m.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 p.m.to 10:00 p.m. and after addition of 10 decibels to sound levels measured in the night between 10:00 p.m. and 7:00 a.m.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: Handbook of Acoustical Measurements and Noise Control, Harris, 1998.

TABLE 2 Typical Noise Levels in the Environment

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110 dBA	Rock band
Jet fly-over at 1,000 feet		
	100 dBA	
Gas lawn mower at 3 feet		
	90 dBA	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80 dBA	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	70 dBA	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60 dBA	
		Large business office
Quiet urban daytime	50 dBA	Dishwasher in next room
Quiet urban nighttime	40 dBA	Theater, large conference room
Quiet suburban nighttime		
	30 dBA	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20 dBA	
		Broadcast/recording studio
	10 dBA	
	0 dBA	

Source: Technical Noise Supplement (TeNS), California Department of Transportation, September 2013.

TABLE 3 Reaction of People and Damage to Buildings from Continuous or Frequent Intermittent Vibration Levels

Velocity Level, PPV (in/sec)	Human Reaction	Effect on Buildings
0.01	Barely perceptible	No effect
0.04	Distinctly perceptible	Vibration unlikely to cause damage of any type to any structure
0.08	Distinctly perceptible to strongly perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
0.1	Strongly perceptible	Threshold at which there is a risk of damage to fragile buildings with no risk of damage to most buildings
0.25	Strongly perceptible to severe	Threshold at which there is a risk of damage to historic and some old buildings.
0.3	Strongly perceptible to severe	Threshold at which there is a risk of damage to older residential structures
0.5	Severe - Vibrations considered unpleasant	Threshold at which there is a risk of damage to new residential and modern commercial/industrial structures

Source: Transportation and Construction Vibration Guidance Manual, California Department of Transportation, September 2013.

Regulatory Criteria

The State of California and Kings County establish regulatory criteria that are applicable in this assessment. The California Environmental Quality Act (CEQA) Guidelines are used to assess the potential significance of impacts pursuant to local General Plan policies, Municipal Code standards, or the applicable standards of other agencies. A summary of the applicable regulatory criteria is provided below.

State CEQA Guidelines. CEQA contains guidelines to evaluate the significance of effects of environmental noise attributable to a proposed project. Under CEQA, noise impacts would be considered significant if the project would result in:

(a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

(b) Generation of excessive groundborne vibration or groundborne noise levels;

(c) For a project located within the vicinity of a private airstrip or an airport land use plan or where such a plan has not been adopted within two miles of a public airport or public use airport, if the project would expose people residing or working in the project area to excessive noise levels.

CEQA does not define what noise level increase would be considered substantial. Typically, project-generated noise level increases of 1.5 dBA L_{dn}/CNEL or greater, where the pre-project noise level is 65 L_{dn}/CNEL or greater, would be considered significant. Project-generated noise level increases of 3 dBA L_{dn}/CNEL or greater would be considered significant where exterior noise levels would exceed the normally acceptable noise level standard (60 dBA L_{dn}/CNEL for residential land uses). Where noise levels would remain at or below the normally acceptable noise level standard with the project, noise level increases of 5 dBA L_{dn}/CNEL or greater would be considered significant. These commonly accepted criteria are also adopted as part of the Kings County Noise Standards for New Uses Affected by Transportation Noise Sources (Kings County 2035 General Plan Noise Element, Table N-7).

Kings County 2035 General Plan. The Noise Element establishes goals, objectives, and policies to guide planning decisions and prevent the exposure of County residents and noise sensitive land uses from excessive noise levels.

Applicable goals and policies presented in the General Plan are as follows:

N GOAL B1 Protect the economic base of Kings County by preventing the encroachment of noise-sensitive land uses into areas affected by existing noise-producing uses. More specifically, to recognize that noise is an inherent byproduct of many land uses, including agriculture, and to prevent new noise-sensitive land uses from being developed in areas affected by existing noise-producing uses.

N OBJECTIVE B1.1 Reduce the potential for exposure of County residents and noise-sensitive land uses to excessive noise generated from Non-Transportation Noise Sources.

N Policy B1.1.1: Appropriate noise mitigation measures shall be included in a proposed project design when the proposed new use(s) will be affected by or include non-transportation noise sources and exceed the County's "Non-Transportation Noise Standards" (Table N-8). Mitigation measures shall reduce projected noise levels to a state of compliance with this standard within sensitive areas. These standards are applied at the sensitive areas of the receiving use.

N Policy B1.1.3: Noise associated with construction activities shall be considered temporary, but will still be required to adhere to applicable County Noise Element standards.

Kings County General Plan Noise Element Table N-7

Table N-7 Noise Standards for New Uses Affected by Transportation Noise Sources

New Land Use	Sensitive[1] Outdoor Area - CNEL	Sensitive Interior[2] Area - CNEL	Notes
Residential	60	45	5
Residences in Ag. Zones	65	45	6
Transient Lodging	65	45	3,5
Hospitals & Nursing Homes	60	45	3, 4, 5
Theaters & Auditoriums	---	35	3
Churches, Meeting Halls	60	40	3
Schools, Libraries, etc.	60	40	3
Office Buildings	65	45	3
Commercial Buildings	65	50	3
Playgrounds, Parks, etc.	70	---	
Industry	65	50	3

Notes:

1. Sensitive areas are defined acoustic terminology section.
2. Interior noise level standards are applied within noise-sensitive areas of the various land uses, with windows and doors in the closed positions.
3. Where there are no sensitive exterior spaces proposed for these uses, only the interior noise level standard shall apply.
4. Hospitals are often noise-generating uses. The exterior noise level standards for hospitals are applicable only at clearly identified areas designated for outdoor relaxation by either hospital staff or patients.
5. If this use is affected by railroad or aircraft noise, a maximum (Lmax) noise level standard of 70 dB shall be applied to all sleeping rooms with windows closed to reduce the potential for sleep disturbance during nighttime noise events.
6. Due to the noise-generating nature of agricultural activities, it is understood that residences constructed on agriculturally-designated land uses may be exposed to elevated noise levels. As a result, a 65 dB CNEL exterior noise level standard is applied to noise-sensitive outdoor areas of these uses.

Kings County General Plan Noise Element Table N-8

Table N-8 Non-Transportation Noise Standards
Average (Leq) / Maximum (Lmax)[1]

	Outdoor Area[2]		Interior[3]	
Receiving Land Use	Daytime	Nighttime	Day & Night	Notes
All Residential	55 / 75	50 / 70	35 / 55	
Transient Lodging	55 / 75	---	35 / 55	4
Hospitals & Nursing Homes	55 / 75	---	35 / 55	5, 6
Theaters & Auditoriums	---	---	30 / 50	6
Churches, Meeting Halls, Schools, Libraries, etc.	55 / 75	---	35 / 60	6
Office Buildings	60 / 75	---	45 / 65	6
Commercial Buildings	55 / 75	---	45 / 65	6
Playgrounds, Parks, etc.	65 / 75	---	---	6
Industry	60 / 80	---	50 / 70	6

Notes:

1. The Table N-8 standards shall be reduced by 5 dB for sounds consisting primarily of speech or music, and for recurring impulsive sounds. If the existing ambient noise level exceeds the standards of Table N-8, then the noise level standards shall be increased at 5 dB increments to encompass the ambient.
2. Sensitive areas are defined acoustic terminology section.
3. Interior noise level standards are applied within noise-sensitive areas of the various land uses, with windows and doors in the closed positions.
4. Outdoor activity areas of transient lodging facilities are not commonly used during nighttime hours.
5. Hospitals are often noise-generating uses. The exterior noise level standards for hospitals are applicable only at clearly identified areas designated for outdoor relaxation by either hospital staff or patients.
6. The outdoor activity areas of these uses (if any), are not typically utilized during nighttime hours.

N GOAL C1 Provide sufficient noise exposure information so that existing and potential noise impacts may be effectively addressed in the land use planning and project review processes, and allow flexibility in the development of infill properties which may be located in elevated noise environments.

N OBJECTIVE C1.1 Ensure the sufficient provision of project and site noise information is available along with alternative mitigation approaches to better inform County staff and land use decision makers.

N Policy C1.1.1: All noise analyses prepared to determine compliance with the noise level standards contained within this *Noise Element* shall be prepared in accordance with the County's "Requirements for Acoustical Analyses Prepared in Kings County" (Table N-9).

Kings County General Plan Noise Element Table N-9

Table N-9 Requirements for Acoustical Analyses Prepared in Kings County	
An acoustical analysis prepared pursuant to the *Noise Element* shall:	
A.	Be the responsibility of the applicant.
B.	Be prepared by qualified persons experienced in the fields of environmental noise assessment and architectural acoustics.
C.	Include representative noise level measurements with sufficient sampling periods and locations to adequately describe local conditions.
D.	Estimate projected future (20 year) noise levels in terms of the Standards of Tables N-7 and N-8, and compare those levels to the adopted policies of the *Noise Element*.
E.	Recommend appropriate mitigation to achieve compliance with the adopted policies and standards of the *Noise Element*.
F.	Estimate interior and exterior noise exposure after the prescribed mitigation measures have been implemented.

N Policy C1.1.2: Where noise mitigation measures are required to satisfy the noise level standards of this *Noise Element*, emphasis shall be placed on the use of setbacks and site design, prior to consideration of the use of noise barriers.

Kings County Code of Ordinances. Article 10 of the Code of Ordinances sets forth requirements and procedures for noise abatement in the County. Section 15-211 (Certain Noise Prohibited) provides as follows:

> "No person shall make, suffer, or permit upon any premises owned, occupied or controlled by such person any noises or sounds which are physically annoying to the senses of persons of ordinary sensitivity, or which are so harsh or so prolonged or unnatural or unusual in their use, time or place, as to cause physical discomfort to neighbors or to interfere with the comfortable use and enjoyment of life or property, or which constitutes a public or private nuisance, within any unincorporated territory of the County of Kings.

The Code of Ordinances provides no further detail on acceptable noise levels or limits on hours for operational or construction noise sources. As such, the General Plan Noise Element requirements and standards (reproduced above) are controlling with respect to quantitative noise thresholds.

The Kings County Subdivision Ordinance (Chapter 21 of the Kings County Code of Ordinances) provides that one of its objectives is to ensure that land developments will not adversely affect the values or enjoyment of nearby properties. Under Section 21-10 of the Ordinance, the Health Department is responsible for analyzing project elements affecting the environment such as noise.

Existing Noise Environment

Figure 1 shows the project vicinity. The existing noise environment in the project area is typical of rural agricultural environments. The primary noise sources in the project vicinity include: 1) traffic on a County road (Nevada Avenue) and State Highway (SR-41); 2) agricultural equipment and crop dusters; and, 3) occasional overflights by military aircraft from Naval Air Station Lemoore (NASL).

The Grape Solar Project site is located approximately 9.0 miles south of the airfield at NASL, and is included in the study area for the NAS Lemoore Joint Land Use Study. The project site is located within the NASL flight pattern with military aircraft noise levels ranging from less than 60 dBA to 70 dBA CNEL, according to the noise contour mapping contained in the NAS Lemoore Joint Land Use Study (JLUSPC 2011, p. 2-11).

There are no noise-sensitive residential receivers within 0.5 mile of the project site. The nearest residences to the project site include the following: 1) Three ranch complexes (with a total of eight dwellings) located 0.5 miles east, 1.0 mile southeast, and 1.5 miles northeast of the site along the east side of SR-41; 2) Five dispersed agricultural residences located 2.2 to 3.9 miles northeast of the project site along 22nd Avenue; 3) The Shannon Ranch complex (including 20 dwellings) located 2.5 miles northwest; and 4) The Stone Land Company Ranch (with 2 dwellings) located 3.4 miles west along Nevada Avenue.

In order to document noise conditions at the receptors in the Shannon Ranch complex, a long-term noise measurement was conducted alongside Avenal Cutoff Road at the ranch between Monday, December 14, 2015 and Tuesday, December 15, 2015. The sound level meter was placed approximately 80 feet from the center of Avenal Cutoff Road to represent the noise exposure at residences in the immediate vicinity of the roadway. The noise measurements documented the existing daily trend in noise levels due to traffic. The day-night average noise level at this site was 75 dBA L_{dn}. Typical daytime hourly average noise levels were approximately 66 to 72 dBA L_{eq}. Data collected from the long-term noise measurement at Shannon Ranch are graphically displayed on Figure 2.

In order to document conditions at the receptors in the Stone Land Company Ranch complex, a long-term noise measurement was conducted alongside Nevada Avenue at the ranch between Monday, December 14, 2015 and Tuesday, December 15, 2015. The sound level meter was placed approximately 27 feet from the center of Nevada Avenue to represent the noise exposure at residences in the immediate vicinity of the roadway. The noise measurements documented the existing daily trend in noise levels due to traffic. The day-night average noise level at this site was 67 dBA L_{dn}. Typical daytime hourly average noise levels were approximately 57 to 69 dBA L_{eq}. Data collected from the long-term noise measurement at Stone Land Company Ranch are graphically displayed on Figure 3.

NOISE IMPACTS AND MITIGATION MEASURES

This section describes the significance criteria used to evaluate project impacts under CEQA, provides a discussion of each project impact, and presents mitigation measures, where necessary, to provide a compatible project in relation to sensitive land uses in the project vicinity.

Significance Criteria

The following criteria were used to evaluate the significance of environmental noise resulting from the project:

a) **Temporary or Permanent Noise Increases in Excess of Established Standards.** A significant impact would be identified if project construction or operations would result in a substantial temporary or permanent increase in ambient noise levels at sensitive receivers in excess of the local noise standards contained in the General Plan or Municipal Code.

b) **Generation of Excessive Groundborne Vibration.** A significant impact would be identified if the construction of the project would generate excessive vibration levels.

c) **Exposure of Residents or Workers to Excessive Noise Levels in the Vicinity of a Private Airstrip or an Airport Land Use Plan.** A significant impact would be identified if the project would expose people residing or working in the project area to excessive aircraft noise levels.

Impact Discussion

a) Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Less-than-Significant Impact. Noise would be generated during the construction, operations, and decommissioning phases of the Grape Solar Project. The potential for temporary and permanent noise sources from the project to exceed applicable noise standards is discussed below for each phase of the project.

Construction Phase

During the construction phase, the two main sources of noise would be from on-site grading and construction, and from off-site traffic generation, each of which is discussed in turn below.

On-Site Construction Noise

The construction noise levels would depend on the noise generated by various pieces of construction equipment, the timing and duration of noise-generating activities, and the distance between construction noise sources and noise sensitive receptors. In accordance with the 2035 Kings County General Plan Noise Element policies, a significant noise impact would occur if construction noise levels exceed 55 dBA L_{eq}, and if they exceed the ambient noise environment by 5 dBA L_{eq} or more.

Construction noise levels would be highest during site grading, excavation, and installation of solar equipment. Hourly average noise levels generated by construction equipment associated with the project are calculated to range from 85 dBA L_{eq} to 87 dBA L_{eq} measured at a distance of 50 feet, assuming that all equipment proposed for each construction phase are operating simultaneously. Construction generated noise levels drop off at a rate of about 6 dBA per doubling of distance between the source and receptor (I&R 2020). The nearest noise-sensitive residential land uses are located over 0.5 mile to the east. At this distance, the maximum construction noise levels reaching the nearest residences would range from 51 dBA L_{eq} to 53 dBA L_{eq}, taking into consideration the attenuation of sound with distance from the noise source. These construction-related noise levels would be below the applicable County noise standards and would be lower than ambient daytime noise levels at the nearest receptors. Therefore, project construction activities would not exceed applicable noise standards and the impact would be *less than significant*.

Construction Traffic

The analysis of construction traffic noise used a baseline of existing Average Daily Traffic (ADT) volumes on the affected roadway segments, and added worker and truck volumes generated during project construction. It was calculated that the highest noise level increase on the affected roadways due to project construction traffic would be less than 5 dBA L_{dn}/CNEL above existing traffic noise conditions without the project at the most affected roadway – Nevada Avenue.

Under 2035 Kings County General Plan Noise Policy B1.2.1, the project would result in a significant noise impact if: a) the noise level increase is 5 dBA L_{dn}/CNEL or greater, where the pre-project noise level is less than 60 dBA L_{dn}/CNEL; or b) the noise level increase is 3 dBA L_{dn}/CNEL or greater, where the pre-project noise level between 60 and 65 dBA L_{dn}/CNEL; or c) the noise level increase is 1.5 dBA L_{dn}/CNEL or greater, where the pre-project noise level between 65 dBA L_{dn}/CNEL or greater (Kings County 2010f).

The receptors that would be most affected by project construction traffic would be the two dwellings at the Stone Land Company Ranch located 3.4 miles west of the project site along the segment of Nevada Avenue between the project entrance and Avenal Cutoff Road. Project construction traffic would result in a 57 percent increase in traffic volumes above existing conditions (2020) and a 55 percent increase in traffic volumes above baseline conditions (2022) along this segment of Nevada Avenue during the peak construction period. This would result in a 2 dBA L_{dn} increase in noise levels along this roadway segment. The two residences at the Stone Land Company Ranch are located 150 feet from the centerline of Nevada Avenue. The ambient noise level at the building facades is estimated to be 59 dBA L_{dn} under existing conditions and 60 dBA L_{dn} under baseline conditions. During peak construction, traffic noise levels at the two residences would increase to between 61 to 62 dBA L_{dn}. The 2 dBA L_{dn} increase in noise levels along this roadway segment would not exceed the 3 dBA L_{dn} noise level threshold used to assess the significance of noise impacts, resulting in a less than significant impact where pre-project noise levels are between 60 and 65 dBA L_{dn} under the County's standards.

Under current conditions, the receptors that are subject to the highest ambient noise levels are the existing dwellings at the three ranch complexes to the east, southeast, and northeast along the east side of SR-41. At the nearest ranch complex, located 0.5 miles east of the Grape Solar Project site, the nearest dwelling is 340 feet from the center of the highway. At the second ranch complex, located 1.0 miles southeast of the project site, the nearest dwelling is 610 feet from the center of the highway. At the third ranch complex, located 1.5 miles northeast of the project site, the nearest dwelling is 680 feet from the center of the highway. Based on existing traffic volumes on SR-41, the existing noise levels at the nearest sensitive receptors are calculated to be 59 dBA L_{dn} at the first ranch complex, and 53 dBA L_{dn} at the second and third ranch complexes. The southerly two ranch complexes are on the segment of SR-41 located south of Nevada Avenue, and this segment will undergo a temporary increase in daily traffic volumes of 0.4 percent due to project construction traffic. The third ranch complex, located on the segment of SR-41 located north of Nevada Avenue, would experience a temporary increase in traffic volumes of 10.0 percent due to project construction traffic. At the two southern ranch complexes, the nearest dwellings would be subject to negligible increase (less than 0.1 dBA L_{dn}) in noise levels, which would be well below the 5 dBA L_{dn} increase that would indicate a significant impact where ambient levels are 60 dBA L_{dn}/CNEL or lower, per the County's noise standards. The nearest dwelling in the northern-most ranch complex would experience a small increase (0.5 dBA L_{dn}) due to project construction traffic, which would be well below the 5 dBA L_{dn} increase that would indicate a significant impact where ambient levels are 60 dBA L_{dn}/CNEL or lower, per the County's noise standards.

At the Shannon Ranch complex, located 2.5 miles northwest of the project site, the segment of Avenal Cutoff Road that passes adjacent to the ranch complex would carry little or no construction-related traffic since there are far more direct routes to the project site from any point of trip origination for workers or delivery trucks. As such, the dwellings at the Shannon Ranch complex would be subject to no noise impacts due to project construction.

Along 22nd Avenue, the five agricultural dwellings dispersed along this roadway are located 2.2 to 3.9 miles northeast of the project site. The most southerly of these dwellings is located 0.38 miles northwest of the nearest travel lane on SR-41. The existing noise level at this dwelling is calculated to be below 50 dBA L_{dn}. The increase in traffic noise along the nearest segment of SR-41 due to project construction traffic would be less than 0.5 dBA L_{dn} at this most affected residence on 22nd Avenue. This would be well below the 5 dBA L_{dn} increase that would indicate a significant impact where ambient levels are 60 dBA L_{dn}/CNEL or lower, per the County's noise standards.

In summary, the construction traffic generated by the Grape Solar Project would not exceed the County's applicable noise standards at the most affected sensitive receptors. Therefore, the impact would be *less than significant*.

Operational Phase

During the operational phase of the Grape Solar Project, the two main sources of noise would be from on-site activities, and from off-site traffic generation, each of which is discussed in turn below.

<u>On-Site Noise Sources</u>

Noise sources at the project site would include inverters and transformers necessary to convert the generated power to collection voltage. The 250 MW Grape Solar Project would include a total of 100 inverter/transformer pads (i.e., 1 per 2.5 MW of output). The predicted noise level attributable to one inverter/transformer is 52 dBA L_{max}/L_{eq} measured at a distance of 50 feet from the equipment (I&R 2020). The operation the 100 inverters/transformers at the project would result in an estimated worst-case noise level of 72 dBA L_{max}/L_{eq}, measured at a distance of 50 feet.

The project would include one substation, located along the southern site boundary near the junction of Nevada Avenue and the 25th Avenue alignment, for the purpose of stepping up voltage levels to 230-kV for transmission on the Gen-Tie Line to the Gates Substation in Fresno County. (The impacts associated with the Gen-Tie Line were addressed in the Aquamarine Solar Project and Gen-Tie Line IS/MND, which was adopted by the Kings County Planning Commission on September 9, 2019.) Sources of audible noise within a substation include equipment such as transformers, reactors, voltage regulators, circuit breakers and other intermittent noise generators. Among these sources, transformers, reactors, and circuit breakers have the greatest potential for producing noise. The broadband sound from fans, pumps and coolers has the same character as ambient sound and tends to blend with the ambient noise. Reactors are similar to transformers in terms of audible noise and would generate noise levels of about 40 dBA L_{eq} at 200 feet (SLO County 2011, p. AP. 4-114). The highest noise levels would be produced by circuit breakers, which would occur infrequently when breakers are thrown to protect the system during an electrical fault due to line overloads. The resultant noise would be impulsive in character, being loud and short in duration. The maximum impulse noise level from the breakers would be approximately 105 dBA L_{max} at 50 feet.

The project would also include a battery storage facility located just east of the on-site substation. Based on preliminary plans, the facility would include approximately 250 battery storage units, each enclosed within 40-foot long cargo containers). Each battery storage unit would include racks, switchboards, and integrated HVAC units. . The battery storage units would be served by inverters and transformers located on separate pads outside the containers, with each inverter/transformer set serving two battery containers. Thus the battery storage system would consist of 250 battery containers and 125 inverter/transformer sets. The primary noise source would be the HVAC units on each battery container, which would typically produce noise levels of 68 dBA at a distance of 50 feet during full operation. A typical step transformer has a sound rating of 60 dBA at 5 feet, and a typical power inverter has a noise rating of 77 dBA at 6 feet. The combined noise level from full operation of all of the planned energy storage elements under this configuration would be 92 dBA L_{max}/L_{eq} at 50 feet. The nearest residential receptors to the battery storage facility would be located approximately 1.35 miles southeast and 1.5 miles east of the facility and would be exposed to noise levels of 49 dBA L_{max}/L_{eq} or less.

2035 Kings County General Plan, Noise Policy B1.1.1 requires that appropriate noise mitigation measures be included in a proposed project design when the proposed new use will include non-transportation noise sources that would exceed the County's "Non-Transportation Noise Standards" (Noise Element Table N-8). The daytime noise limits enforced at residential properties are 75 dBA L_{max} and 55 dBA L_{eq} (Kings County 2010f). The inverters/transformers at the project would operate only during daytime hours when the solar facility is generating power. There would be no noise generated by the project at night, when County noise limits are 5 dBA more restrictive (i.e., 70 dBA L_{max} and 50 dBA L_{eq}).

Noise from "point" sources decreases at a rate of 6 dBA with each doubling of the distance between the noise source and receptor (I&R 2020). Based on the worst-case noise level estimate of 72 dBA L_{max}/L_{eq} at a distance of 50 feet from the project solar fields (i.e., inverters/transformers), predicted noise levels at the nearest residential land uses located 0.5 mile from the project site are calculated to be 38 dBA L_{max}/L_{eq}. These noise levels would generally be inaudible above ambient traffic noise levels produced by vehicles along SR-41. Battery storage facility noise levels would be 49 dBA L_{max}/L_{eq} at the nearest receptor approximately 1.35 miles to the southeast of the battery facility. The infrequent occurrence of impulsive noise from circuit breakers at the on-site substation would decrease to 62 dBA L_{max} at the nearest residences located at least 1.35 miles from the substation. In summary, the estimated noise levels from project operations would be below the County's 75 dBA L_{max} and 55 dBA L_{eq} noise limits for residential uses. Therefore, the operational noise from the Grape Solar Project would not exceed applicable noise standards at the nearest sensitive receptors, and the impact would be *less than significant*.

<u>Operational Traffic Noise</u>

Traffic generated during project operations would be very light, given the small number of workers that would travel to the site on an intermittent basis. It was calculated that the highest traffic noise increase attributable to project operational traffic on the affected roadways would be less than 0.1 dBA L_{dn}/CNEL above existing traffic noise conditions without the project at the most affected roadway – Nevada Avenue. The noise levels would be well below the applicable impact thresholds, discussed above, and would not be noticeable to the potentially affected sensitive receptors. Therefore, the operational traffic generated by the Grape Solar Project would not result in a substantial permanent increase in ambient noise levels in the project vicinity, and the impact would be *less than significant*.

Decommissioning Phase

Noise levels generated during deconstruction activities would be similar to those generated during construction except that some of the noisiest construction equipment, such as pile drivers and vibratory rollers, would not be used during decommissioning. As is the case with construction noise, the on-site noise generated during decommissioning would be well below County noise standards at the nearest sensitive receptors. Traffic volumes generated during decommissioning would be similar to those associated with construction, and the resulting noise levels would be well below applicable County standards as well. Therefore, the decommissioning activity and traffic associated with the project would not result in a substantial temporary increase in ambient noise levels in the project vicinity, and the impact would be *less than significant*.

In summary, the noise generated during the construction, operations, and decommissioning phases of the Grape Solar Project would not exceed applicable noise standards, and the impact would be *less than significant*.

b) Would the project result in generation of excessive groundborne vibration or groundborne noise levels?

Less-than-Significant Impact. The construction of the Grape Solar Project may generate perceptible vibration in the immediate vicinity of the project site when heavy equipment or impact tools are used. Groundborne vibration levels would be highest during site preparation activities and when the solar arrays are installed, given that the cylindrical steel posts (or H-beams) will be driven into the ground using truck-mounted vibratory drivers.

Vibration is measured as peak particle velocity (PPV) in inches per second. The equipment to be used at the project site that would result in the greatest vibration includes sonic pile drivers, vibratory rollers, and bulldozers. The vibration levels typically produced by a sonic pile driver can reach 0.170 in/sec PPV at a distance of 25 feet. Vibratory rollers and large bulldozers typically generate vibration levels ranging from of 0.089 to 0.210 in/sec PPV at a distance of 25 feet. Vibration levels would vary depending on soil conditions, construction methods, and equipment used.

The California Department of Transportation recommends a vibration limit of 0.5 in/sec PPV for buildings that are structurally sound and designed to modern engineering standards, 0.3 in/sec PPV for buildings that are found to be structurally sound but where structural damage is a major concern, and a conservative limit of 0.08 in/sec PPV for ancient buildings or buildings that are documented to be structurally weakened. No ancient buildings or buildings that are documented to be structurally weakened are present near the project site. Therefore, the applicable impact threshold for groundborne vibration would be levels exceeding 0.3 in/sec PPV at the nearest receptors.

Within the project vicinity, the nearest structures to the construction activity would be: 1) ranch dwellings located on the east side of SR-41, at least 0.5 miles east, 1.0 mile southeast, and 1.5 miles northeast of the nearest project boundary; 2) the nearest dwellings on 22nd Avenue located at least 2.2 miles northeast of the nearest project boundary 3) ranch dwellings at Shannon Ranch, located at least 2.5 miles northwest of the nearest project boundary; and 4) ranch dwellings at Stone Land Company Ranch, located at least 3.4 miles west of the nearest project boundary. The potential for greatest vibration would be during heavy equipment movement and vibratory pile driving of the support posts for the solar arrays, which would generate vibration levels of 0.210 and 0.170 in/sec PPV, respectively, at 25 feet from the source. At a distance of 0.5 miles, these vibration levels would not be measurable or detectable at the nearest receiver. These vibration levels would be well below the 0.3 in/sec PPV impact threshold for sound structures, and would also be well below the 0.08 in/sec PPV limit applicable to structurally weakened structures. The majority of construction activity at the project site would occur well beyond these distances from the nearest structures. Therefore, groundborne vibration from project construction would have *no impact* on existing structures in the project vicinity.

People can also be adversely affected by excessive vibration levels. The level at which humans begin to perceive vibration is 0.015 inches per second. Vibrations at 0.2 inches per second are considered bothersome to most people, while continuous exposure to long-term PPV is considered unacceptable at 0.12 inches per second. As noted above, the nearest residential receptors are 0.5 miles east of the project site. At these distances, the greatest vibration from the nearest project construction activity would not be perceptible to the nearest residents in the project vicinity. Therefore, project construction activities would not generate excessive vibration levels.

In summary, the heaviest construction equipment that would be used for construction of the Grape Solar Project would produce vibration levels that would be far below the vibration levels necessary to cause damage to the nearest off-site buildings, or to be perceptible to the nearest off-site persons. Therefore, the project would not generate excessive groundborne vibration levels. As such, the potential groundborne vibration and noise impacts due to construction activities associated with the Grape Solar Project would be *less than significant*.

c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

Less-than-Significant Impact. The Grape Solar Project is not located near a public airport or public use airport, and is not located within an airport land use plan area. The nearest public or public use airports include the Hanford and Coalinga municipal airports, and the Harris Ranch airfield, all of which are located 18 miles or more from the project site.

The project site is located 9.0 miles south of the airfield at Naval Air Station Lemoore (NASL), and is included in the study area for the NAS Lemoore Joint Land Use Study (JLUS). The project site is located within the NASL flight pattern and is mapped as land subject to noise levels lower than 70 dBA CNEL as mapped in the NAS Lemoore Joint Land Use Study. The eastern third of the project site is exposed to noise levels between 60 and 70 dBA CNEL, while the western two-thirds of the site is exposed to noise levels of less than 60 dBA CNEL (JLUSPC 2011, p. 2-11). The Kings County General Plan noise standard for the noise-sensitive outdoor areas of commercial or industrial developments is 65 dBA CNEL if the noise is from transportation sources such as aircraft overflights (Kings County General Plan Noise Element Table N-7). Approximately 125 acres along the eastern boundary (~8 percent of the site area) is subject to aircraft noise levels of 65 to 70 dBA CNEL. However, the proposed solar facilities are not considered noise-sensitive land uses and will have no permanent employees stationed on-site that would utilize outdoor use areas. Although Kings County has not established a noise limit for outdoor use areas that are not noise sensitive, noise levels exceeding 76 dBA CNEL are considered hazardous to health as determined by the US Environmental Protection Agency (US EPA 1974). Aircraft overflights would expose construction workers, who would be on the site temporarily, and the operational workers, who would visit the site periodically, to worst-case noise levels of less than 70 dBA CNEL, and well below the 76 dBA CNEL threshold. Therefore, the project would not expose workers on the project site to excessive noise levels from flight operations as NAS Lemoore. As such, the impact of the Grape Solar Project's exposure to noise from airport operations would be *less than significant*.

The Grape Solar Project site is not located within the immediate vicinity of a private airstrip. There are 6 airstrips within a 5-mile radius of the site, the nearest of which is 1.2 miles to the south. Aircraft overflights associated with private airstrips are infrequent in nature, and as such, the project would not expose people working at the project site to excessive noise levels associated with the operation of a private airstrip. Therefore, the Grape Solar Project would be associated with no impact due to noise generated by private airstrips in the vicinity.

In summary, the impact associated the Grape Solar Project's exposure to noise from airport operations associated with a private airstrip or public airport or public use airport or would be *less than significant*.

REFERENCES – NOISE

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CPUC 2009	California Public Utilities Commission (CPUC). 2009. *Draft Environmental Impact Report – Southern California Edison's San Joaquin Cross Valley Loop 220 KV Transmission Line Project*. CPUC A.08-05-039. June 2009. http://www.cpuc.ca.gov/Environment/info/esa/sjxvl/deir_toc.html
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Kings County 2010f	County of Kings. 2010. *2035 Kings County General Plan – Noise Element*. Adopted January 26, 2010. http://www.countyofkings.com/home/showdocument?id=3120
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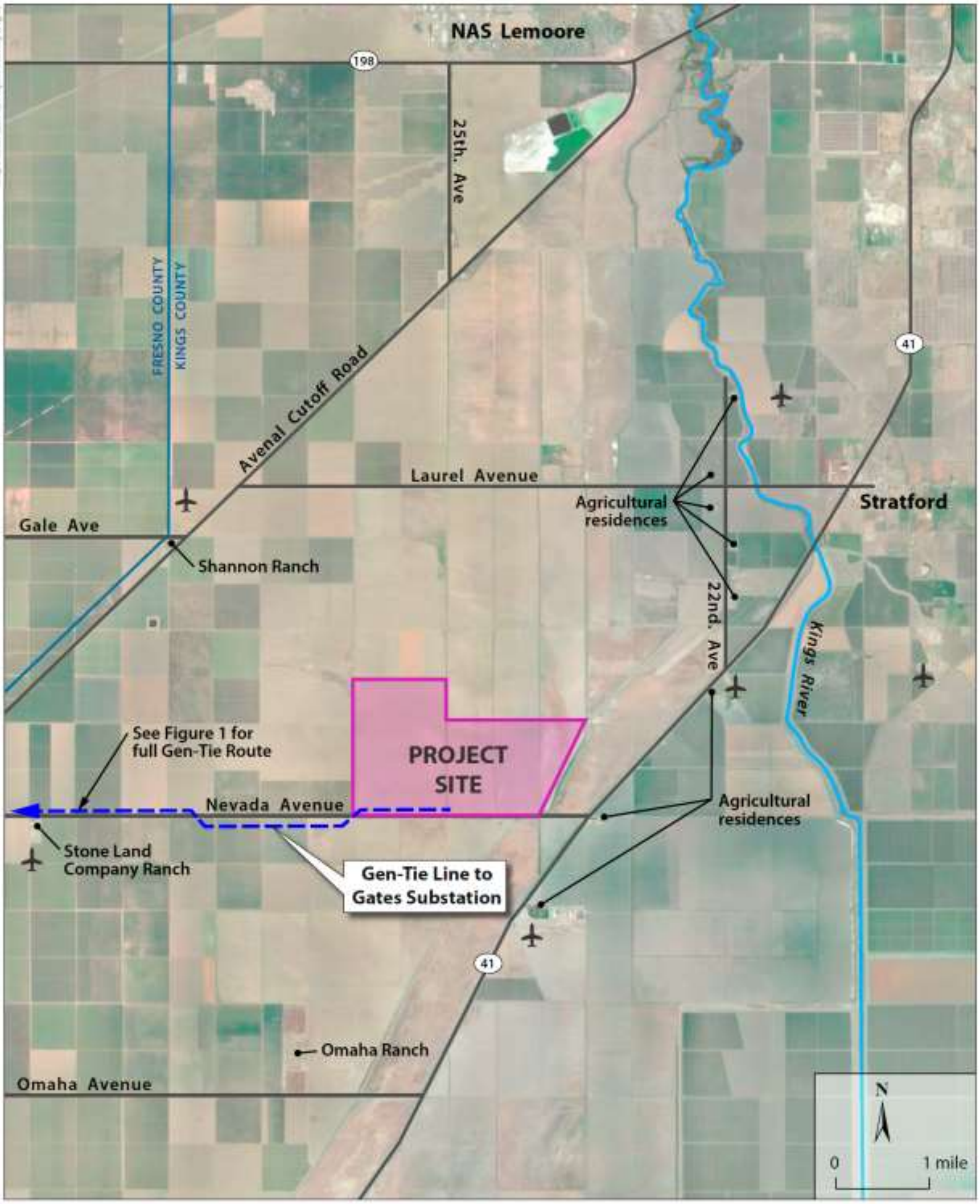
US EPA 1974	U.S. Environmental Protection Agency (US EPA). 1974. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. March. Available at https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=2000L3LN.TXT

Figure 1 **Project Vicinity**



Source: Google Earth, 2019

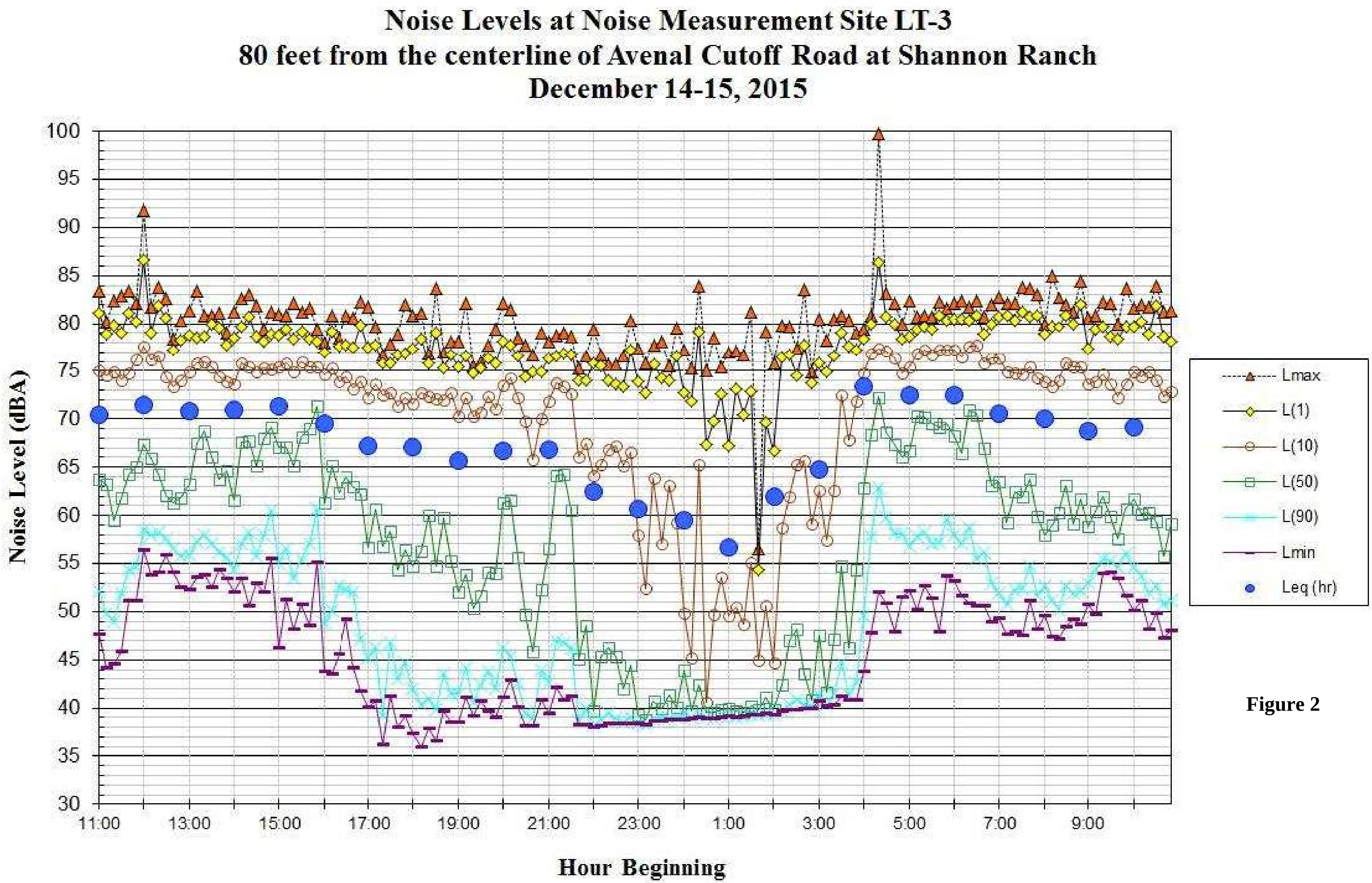

Noise Levels at Noise Measurement Site LT-3
80 feet from the centerline of Avenal Cutoff Road at Shannon Ranch
December 14-15, 2015
Noise Level (dBA)
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
11:00
13:00
15:00
17:00
19:00
21:00
23:00
1:00
3:00
5:00
7:00
9:00
Hour Beginning
Lmax
L(1)
L(10)
L(50)
L(90)
Lmin
Leq (hr)

Figure 2

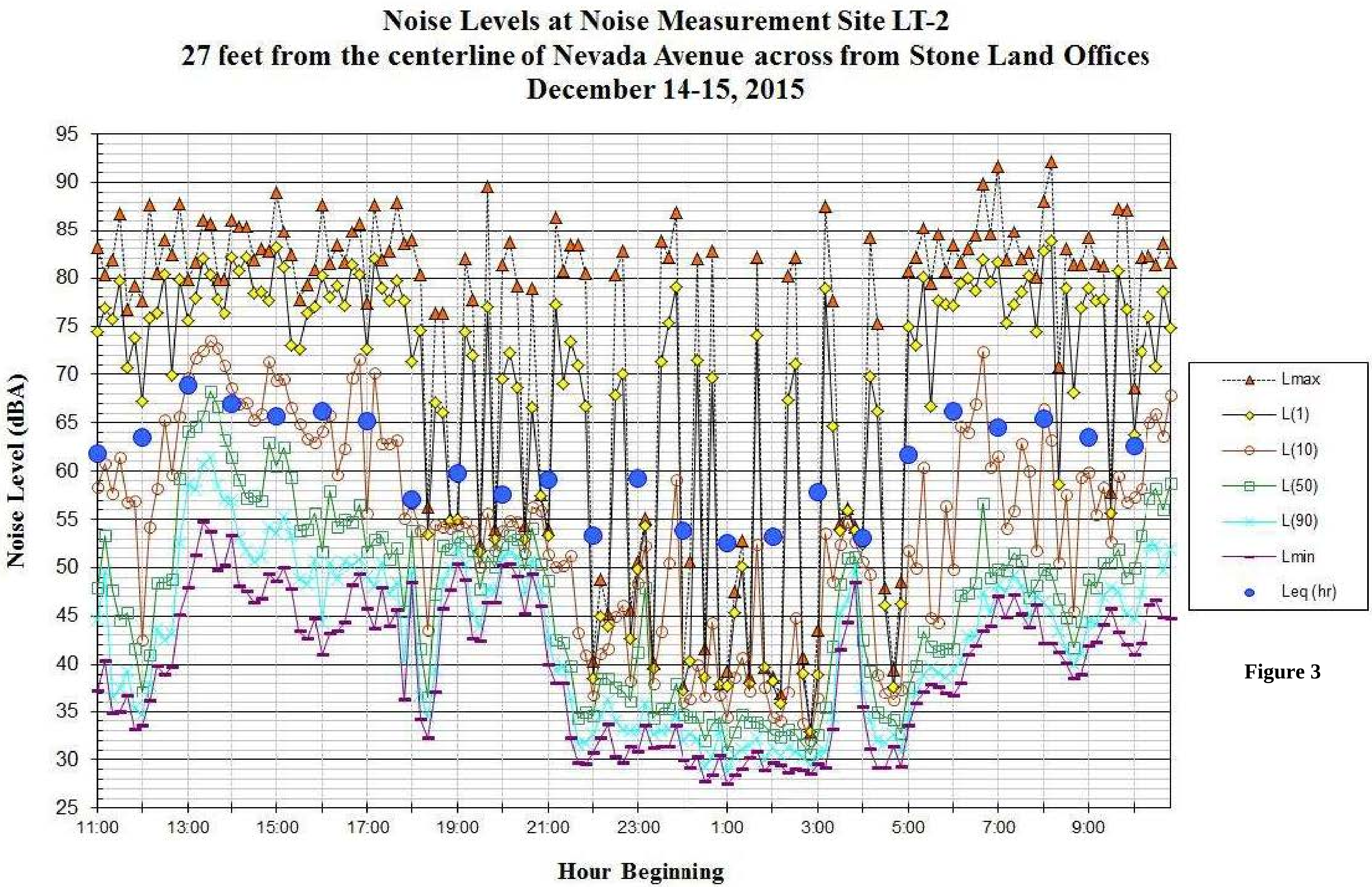

Noise Levels at Noise Measurement Site LT-2
27 feet from the centerline of Nevada Avenue across from Stone Land Offices
December 14-15, 2015
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
Noise Level (dBA)
11:00
13:00
15:00
17:00
19:00
21:00
23:00
1:00
3:00
5:00
7:00
9:00
Hour Beginning
Lmax
L(1)
L(10)
L(50)
L(90)
Lmin
Leq (hr)

Figure 3

APPENDIX D

Water Supply Assessment

Prepared by

Karen E. Johnson, Water Resources Planning

December 2020

Water Supply Assessment

Grape Solar Project

Kings County, California

Prepared for:

Bert Verrips, AICP, Environmental Consulting

December 2020

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CHAPTER 1 – INTRODUCTION

BACKGROUND AND PURPOSE

This Water Supply Assessment (WSA) was prepared for Bert Verrips, AICP, Environmental Consulting, the firm preparing the Initial Study/Mitigated Negative Declaration (IS/MND) for the Grape Solar Project (project) on behalf of Kings County Community Development Agency (CDA). CDA is the lead agency conducting the environmental review of the project.

The primary purpose of the WSA is to determine if there is sufficient water supply to meet the demands of the project and future water demands under normal and dry water years over the next 20 years. The WSA will be included in the IS/MND prepared for the project pursuant to the California Environmental Quality Act (CEQA). This forms the basis for an assessment of water supply sufficiency in accordance with the requirements of California Water Code §10910, *et seq.* The WSA was prepared in conformance with the requirements of Senate Bill 610 (Chapter 643, Statutes of 2001) (referred to here as SB 610). SB 610 was adopted, along with a companion measure Senate Bill 221 effective January 1, 2002, to improve the nexus between land use planning and water supply availability. Information regarding water supply availability is to be provided to local public agency decision makers prior to approval of development projects that meet or exceed specific criteria.

- A proposed residential development of more than 500 dwelling units.
- A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.
- A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.
- A proposed hotel or motel, or both, having more than 500 rooms.
- A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.
- A mixed-use project that includes one or more of the projects defined above.
- A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project

SB 610 was not originally clear on whether renewable energy projects are subject to SB 610 and require a WSA. However, SB 267 was signed into law on October 8, 2011, amending California's Water Law to revise the definition of "project" specified in SB 610. Under SB 267, wind and photovoltaic projects which consume less than 75 acre-feet per year (afy) of water are not considered to be a "project" under SB 610 (DWR, 2003b). As discussed in Chapter 2, a water demand of 352 afy will be needed for construction over 18 months, with an ongoing annual operational demand of 32afy after construction is completed.

There is no public potable water system available or needed to serve the project. The project site is located within the boundaries of Westlands Water District (District) which provides irrigation water to users within its jurisdiction. The District does not deliver treated water for human consumption and is not considered a public water system. Water required during construction and operation of the project does not need to be treated for human consumption and will be obtained from groundwater wells and/or from the District. There is no Urban Water Management Plan (UWMP) that accounts for the project water demands because UWMPs are prepared by urban water suppliers. The District is not considered an urban water supplier and is not required to prepare an UWMP.

DESCRIPTION OF THE PROPOSED PROJECT

Grape Solar Project

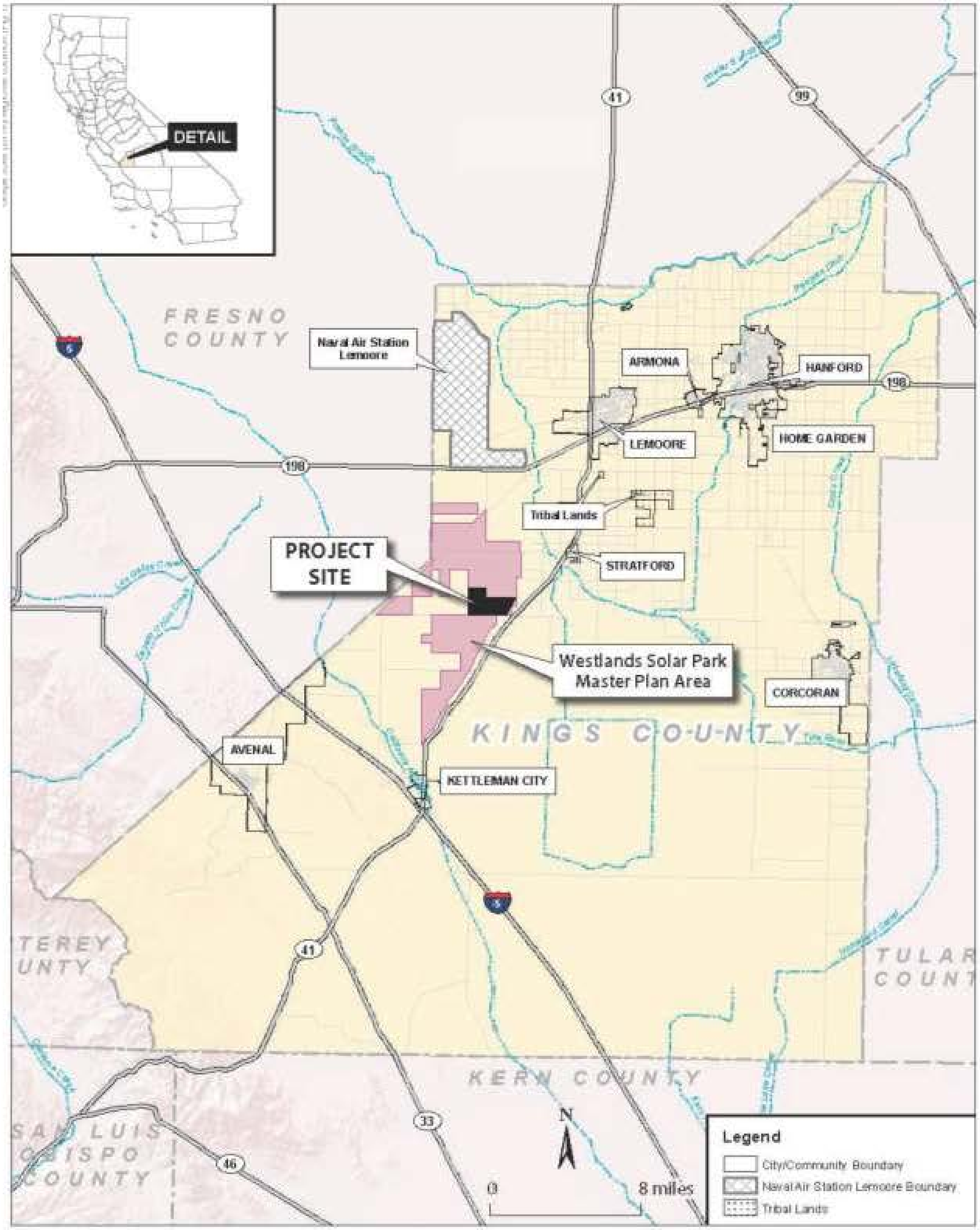
The Grape Solar Project is planned as a 250 MW solar generating facility on a 1,759-acre site located on the north side of Nevada Avenue, approximately 0.5 mile west of SR-41 in west-central Kings County. The site is bisected from north to south by the unimproved 25th Avenue alignment (see Figure 1, Regional Location, and Figure 2, Project Vicinity).


Solar panels

The Grape Solar Project will largely consist of solar modules mounted on a series of horizontal single-axis trackers to be oriented in north-south rows which will rotate the solar arrays in an east-west direction. The solar modules generate direct current (DC) power and the electricity travels via underground cables to inverters to be converted to alternating current (AC) power. The project will include a total of 100 PCSs with power rating of 2.5 MW each, which will step up the generated power to a collection voltage of 34.5-kV.

The Grape Solar Project will include an Operations and Maintenance (O&M) facility and substation near the northwest corner of Nevada Avenue and the unimproved 25th Avenue alignment, just inside the southern border of the project site. The on-site substation will step up the generated power from 34.5-kV collection voltage to 230-kV for transmission via the Gen-Tie Line to be constructed in conjunction with the Aquamarine Solar Project located one mile to the north. The Gen-Tie Line will convey the solar power generated at the Grape Solar facility westward for a distance of 12 miles to the Gates Substation located on Jayne Avenue in Fresno County.

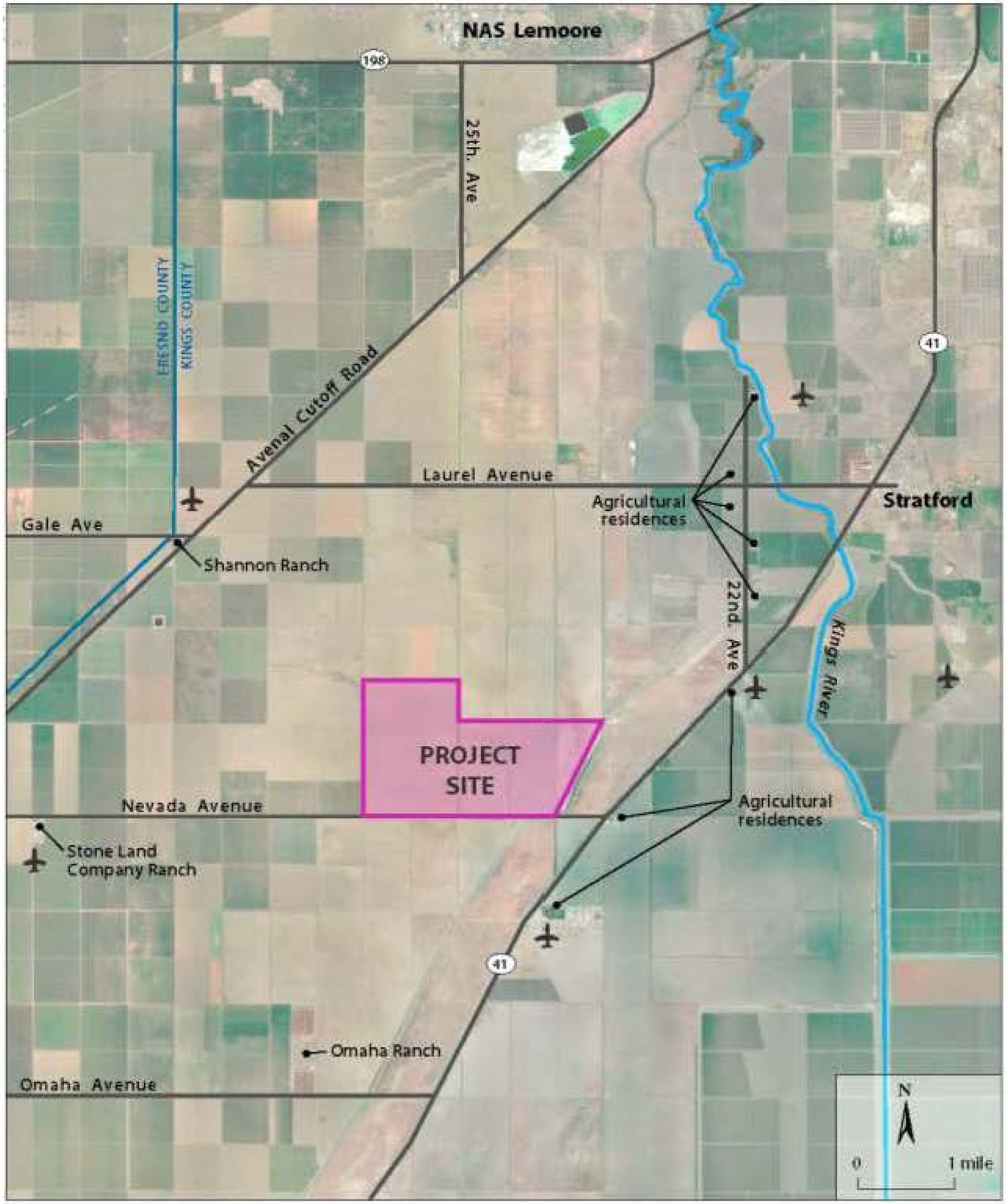
Domestic wastewater disposal would be provided by a septic tank and leachfield system located adjacent to the O&M building. During construction, wastewater needs would be provided by portable chemical toilets which will be serviced by a private contractor.



Source: Kings County Community Development Agency

Map Source: Bert Verrips, AICP, Environmental Consulting

Regional Location
Figure 1



Source: Google Earth, 2019

Map Source: Bert Verrips, AICP, Environmental Consulting

Project Vicinity
Figure 2

Westlands Solar Park Master Plan

The Grape Solar Project is an integral part of the Westlands Solar Park (WSP) Master Plan. The WSP Master Plan is planned for a series of large utility-scale photovoltaic (PV) solar energy generating facilities on a total area of approximately 20,900 acres. The WSP Master Plan area is in unincorporated west-central Kings County, south of Naval Air Station Lemoore, as shown on Figure 1. The Water Supply Assessment prepared for the WSP Master Plan in 2017 is referred to in this document (WWD, 2017).

The project site is within the Westlands Competitive Renewable Energy Zone (CREZ) as identified through the Renewable Energy Transmission Initiative (RETI). Almost half (9,800 acres) of the WSP Master Plan area has been retired from irrigated agricultural uses while the remaining irrigated lands (11,100 acres) purchase water from the District and/or pump groundwater.

The WSP Master Plan provides a planning framework for the comprehensive and orderly development of renewable solar energy resources within the WWD CREZ. The total peak generating capacity of the project is estimated to be approximately 2,000 megawatts (MW) based on current solar PV technology and collection systems. The Program EIR (including the WSA) on the Westlands Solar Park Master Plan and Gen-Tie Corridors Plan was certified by the Westlands Water District Board of Directors on January 16, 2018. The Program EIR was prepared in coordination with the Kings County Community Development Agency staff, who plan to use the Program EIR as a first tier CEQA document in the preparation of subsequent MNDs prepared on individual solar projects proposed within the WSP Master Plan area. The development of Westlands Solar Park is planned to occur through the incremental installation of individual solar projects privately developed over a 12 year period from 2019 through 2030 (WWD, 2017; Kings County, 2019). The Grape Solar Project will be constructed within the WSP Master Plan area.

The proposed Grape Solar Project relies on the construction of a 15-mile transmission generation-interconnection tie lines (gen-ties) extending from the Aquamarine Solar project site to the Gates Substation in Fresno County to the west. This gen-tie line was included in the WSP Master Plan which plans for two 230-kV generation-interconnection tie-lines (gen-ties) which will deliver solar-generated power to the California grid at Gates Substation.

Chapter 2 of this WSA provides a discussion of future project water demands and historical site demands. Water supply information is provided in Chapter 3. The comparison of water demands with supplies and the reliability of supplies is provided in Chapter 4 followed by the sufficiency findings in Chapter 5.

CHAPTER 2 – WATER DEMANDS

The regional climatic characteristics are summarized along with projected project water demands and current water production requirements for the site.

CLIMATIC CONDITIONS

The project area is in the semi-arid San Joaquin Valley. Temperatures during the summer are hot, frequently exceeding 100 degrees Fahrenheit. Cool winters occasionally fall below freezing. Average maximum and minimum temperatures are presented in Table 1 for the closest station which is near Kettleman City. The growing season is long with most rainfall occurring between November and April. As presented in Table 1, the average annual precipitation is 6.6 inches. With climate change, the State Department of Water Resources (DWR) expects a reduced snowpack, spring runoff shifting to earlier in the year, more frequent and extreme dry periods, and shorter winters.

Table 1. Climate Data[1]

Month	Average Maximum Temperature (F)	Average Minimum Temperature (F)	Average Precipitation (inches)
January	55.2	35.2	1.38
February	62.1	39.7	1.18
March	68.1	42.9	0.82
April	74.3	47.2	0.69
May	84.4	54.5	0.31
June	93.0	61.7	0.06
July	100.1	68.0	0.01
August	98.6	66.5	0.03
September	92.1	60.7	0.09
October	80.6	52.0	0.27
November	67.1	41.8	0.72
December	56.1	35.7	1.08
Annual	**77.6**	**50.5**	**6.64**

Source: Temperature and precipitation from Kettleman City, Ca #044534, Western Regional Climate Center for period of record February 1955 through June 2016. (WRCC, 2020)

PROJECT WATER DEMANDS

Water demands for the Grape Solar project consist of temporary construction demands over an 18 month period and long term operational demands for washing the solar modules and general operations.

Construction Water Use

The highest water demands are associated with construction in preparing the site for the solar arrays and trenching for conduit. During this earthwork phase of construction, non-potable water will be used for dust control. Based on past experience with similar solar projects, each acre of construction area will require 0.2 acre-feet of water during construction, as presented in Table 2.

The 250-MW project will occupy a total site area of 1,759 acres resulting in total construction water demand of 352 acre-feet, as presented in Table 2. With an 18 month construction schedule spread evenly over two years, annual construction demands average 176 afy. Water supply for construction demands will be provided by wells from an existing agricultural well in the project vicinity.

Table 2. Construction Water Demands

Activity*	Water Use	Unit
Dust Control Demand Factor	0.2	acre-feet/acre
Total Construction Water Demands	352	acre-feet
Annual Construction Demands	176	AFY

*Based on 1,759 acre project site and 18 month construction period spread evenly over 2 years
Source: Bert Verrips, AICP, Environmental Consulting, 2020.

Operational Water Use

Maintenance will primarily consist of washing the PV modules about four times each year to remove accumulated dust from panel surfaces to maintain efficiency. The cleaning interval is determined by the rate at which electrical output degrades between cleanings. Periodic panel washing will most likely be needed during dry summer months with increased deposition of windblown dust from nearby agricultural operations. Light duty trucks with tow-behind trailers with small water tanks will transport the water; workers spray to wet the panel surfaces then squeegee the panels dry. No chemical cleaners will be used for module washing. Water demand unit factors, based on experience with other solar projects, are presented in Table 3. The panel washing unit factor is based on 1/8 of a gallon per square foot of panel or module, with module size of 20.87 square feet, and a total of 908,376 modules. Four washings per year will use 9,478,904 gallons, or 37,916 gallons per MW per year (gal/MW/yr).

In addition to panel washing, sheep will be grazing the site for approximately five months during the first half of each year to keep site vegetation under control. Sheep grazing within the project area is based on 0.5 sheep per acre, on 1,600 acres to remain in vegetative cover in the solar facility, for a total of 800 sheep. Sheep grazing five months (151 days) per year, at 3 gallons per day per sheep, equals 453 gallons per sheep per year. Thus the total water required for the 800 sheep is 362,400gallons per year or 1,450 gal/MW/yr.

An additional ongoing water demand is for general operations and maintenance (e.g., equipment washing, septic system, and other non-potable water uses). The general operations unit demand is 2,000 gal/MW/yr.

As presented in Table 3, with the project generating 250 MW at buildout, total operational water demands are 10.34 million gallons per year or 31.7 AFY. Total operational water demands per MW are 41,365 gal/MW/yr. This is equivalent to 0.180 acre-feet per acre per year (af/ac/yr) (rounded to 0.02) or 2.89 acre-feet per quarter-section (160 acres). Small quantities of potable water will be required at the solar facilities for drinking and other uses. Potable water will be delivered to each site by a water delivery service. Overall, annual water demands are not anticipated to vary based on climatic conditions.

Table 3. Operational Water Demands

Activity	Water Use	Unit
Demand Factors		
Panel Washing Demand Factor	37,916	gal/MW/yr
Sheep Watering	1,450	gal/MW/yr
General Operations Demand Factor	2,000	gal/MW/yr
Project Water Demands		
Panel Washing Demands	9,478,904	gallons per year
	29.09	AFY
Sheep Watering	362,400	gallons per year
	1.11	AFY
General Operations Demands	500,000	gallons per year
	1.53	AFY
Total Operational Water Demands	**10,341,304**	**gallons per year**
	10.34	**million gallons/year**
	31.7	**AFY**

Note: Based on 250 MW project at buildout
Source: Bert Verrips, AICP, Environmental Consulting, 2020.

The water supply for ongoing operations will be provided by Westlands Water District. The District has a distribution system of laterals that convey imported surface water. District water supplies are from several sources, as discussed in the following chapter.

HISTORICAL WATER PRODUCTION

Under current conditions, most of the site is used for the cultivation of winter wheat during the wet season and is typically left fallow during the dry season. The site has been owned by the District since the early 2000's and was retired from irrigated agriculture. No consumption of water occurs on the project site.

CHAPTER 3 – WATER SUPPLIES

Water for project construction needs will be provided by an existing agricultural well in the project vicinity. Upon completion, water for ongoing operational water supplies will be provided by the District through its conveyance system from imported surface water sources. This section discusses surface water and groundwater available to the project, District supply conditions, water management activities, and reliability of project supplies.

CURRENT WATER USE

As discussed in Chapter 2, there is no current water consumption on the 1,759 acre Grape Solar Project site. Within the WSP Master Plan area, agricultural water supplies for irrigated lands are currently provided by the District with groundwater pumping from on-site wells. The groundwater supply is untreated non-potable water for crop irrigation; there are no sources of potable domestic water within the master plan area.

SURFACE WATER SUPPLIES

The Grape Solar Project site, shown on Figure 2, lies entirely within the boundaries of the District. The WWD was formed in 1952 to serve agricultural water users on the west side of the San Joaquin Valley and has a service area of 610,000 acres, of which 44,000 acres is retired, non-irrigated farmland. The total volume of water required for the entire irrigable area of 568,000 acres within WWD is about 1.5 million acre-feet. Upon completion of the San Luis Canal by the U.S. Bureau of Reclamation (USBR) in 1968, WWD began receiving deliveries of Central Valley Project (CVP) water from the Delta. Water is delivered from the Sacramento River-San Joaquin River Delta during winter months and is stored in the San Luis Reservoir. Water is then delivered to District growers through the San Luis Canal and the Coalinga Canal. Once it leaves the federal project canals, water is delivered through approximately 1,030 miles of pipeline.

Westlands' annual water entitlement from the USBR's Central Valley Project is 1,193,000 acre-feet, or about 300,000 acre-feet less than irrigation needs of approximately 1.5 million afy. Thus Westlands' surface water supply entitlement of CVP water is short even when 100 percent of the Contract water is available. Some of the difference is made up by well water from the lower aquifer and water transfers (the latter averaging 150,000 acre-feet per year). Under the terms of a 2015 settlement agreement between WWD and the U.S. Department of Justice, WWD's annual water deliveries are capped at 895,000 acre-feet (USBR 2015). Thus the annual shortfalls of water supply are approximately 500,000 acre-feet per year, assuming full delivery of surface water and annual transfers of 150,000 acre-feet per year.

The west side of the San Joaquin Valley was among the last areas in the Central Valley to receive imported water from the Delta and thus has a lower priority to receive contract water from the federal CVP. The south of Delta contractors suffer disproportionately during drought conditions when water deliveries are curtailed. For example, as presented in Table 4, during the last ten years between 2010 and 2019, WWD received its full 100 percent contract entitlement in only one year - 2017. In seven of those 10 years, WWD received water allocations that were 50 percent or less than its contract entitlement. The average annual water allocation received during that 10 year period was about 453,128 acre-feet, or 38 percent of the contract entitlement.

The District augments CVP contract water with other supplies such as flood flows from the San Joaquin and Kings rivers when available; these seasonal supplies are made available to the District as they flow into the Mendota Pool. Water transfers have become an important component in the District supply portfolio. Transfers and other purchases are included in Table 4 as Additional District Supply. Transfers from other water districts are pursued each year to supplement contract deliveries. The amount of groundwater pumped from the basin in any given year is typically inversely proportional to the availability of surface water supplies; this is evident for dry water years 2013 through 2016, and the wet water year of 2017, as shown in Table 4.

In February 2020, the District signed a permanent water repayment contract with the Bureau of Reclamation which would convert its current water service contracts to permanent repayment contracts as of June 1, 2020. This provision of the Water Infrastructure Improvements for the Nation Act of 2016, which is intended to increase the reliability of water deliveries in exchange for prepayment of infrastructure (with these funds allocated to fund water storage projects), has been challenged in court. This WSA is not relying on increased reliability associated with the repayment contract.

REGIONAL GROUNDWATER SUPPLY

The District does not supply groundwater to District growers nor does it regulate the use of groundwater. Growers within the District service area augment District deliveries with pumped groundwater to meet irrigation needs. The WSP Master Plan area overlies the Westside Subbasin (5-22.09) of the San Joaquin Valley Basin within the Tulare Lake Hydrologic Region. Although the District collects some pumping data, the lack of a complete database of extraction data and replenishment rates within the subbasin makes it difficult to estimate baseline conditions regarding water supply availability. This is a common problem in the San Joaquin Valley as the majority of water usage is associated with individual agricultural water users with a lack of consistent groundwater monitoring and reporting programs. Where data are not available to make quantitative estimates of water availability and reliability, reasonable assumptions are made here based on information and data that are available.

Table 4. Westlands Water District Water Supplies

Water Year	CVP Allocation %	Net CVP (AF)	Ground-water (AF)	Water User Acquired (AF)	Additional District Supply (AF)	Total Supply (AF)	Fallowed Acres
1988	100%	1,150,000	160,000	7,657	97,712	1,415,369	45,632
1989	100%	1,035,369	175,000	20,530	99,549	1,330,448	64,579
1990	50%	625,196	300,000	18,502	-2,223	941,475	52,544
1991	27%	229,666	600,000	22,943	77,399	930,008	125,082
1992	27%	208,668	600,000	42,623	100,861	952,152	112,718
1993	54%	682,833	225,000	152,520	82,511	1,142,864	90,413
1994	43%	458,281	325,000	56,541	108,083	947,905	75,732
1995	100%	1,021,719	150,000	57,840	121,747	1,351,306	43,528
1996	95%	994,935	50,000	92,953	172,609	1,310,497	26,754
1997	90%	968,408	30,000	94,908	261,085	1,354,401	35,554
1998	100%	945,115	15,000	54,205	162,684	1,177,004	33,481
1999	70%	806,040	60,000	178,632	111,144	1,155,816	37,206
2000	65%	695,693	225,000	198,294	133,314	1,252,301	46,748
2001	49%	611,267	215,000	75,592	135,039	1,036,898	73,802
2002	70%	776,526	205,000	106,043	64,040	1,151,609	94,557
2003	75%	863,150	160,000	107,958	32,518	1,163,626	76,654
2004	70%	800,704	210,000	96,872	44,407	1,151,983	70,367
2005	85%	996,147	75,000	20,776	98,347	1,190,270	66,804
2006	100%	1,076,461	25,000	45,936	38,079	1,185,476	54,944
2007	50%	647,864	310,000	87,554	61,466	1,106,884	96,409
2008	40%	347,222	460,000	85,421	102,862	995,505	99,663
2009	10%	202,991	480,000	68,070	70,149	821,210	156,239
2010	45%	590,059	140,000	71,296	79,242	880,597	131,339
2011	80%	876,910	45,000	60,380	191,686	1,173,976	59,514
2012	40%	405,451	355,000	111,154	123,636	995,241	112,755
2013	20%	188,448	638,000	101,413	143,962	1,071,823	131,848
2014	0%	98,573	655,000	59,714	26,382	839,669	220,053
2015	0%	82,429	660,000	51,134	34,600	828,163	218,112
2016	5%	9,204	612,000	72,154	174,374	867,732	179,784
2017	100%	911,307	54,000	-50,009	174,490	1,089,788	146,275
2018	50%	580,050	328,000	42,338	55,872	1,006,260	148,320
2019	75%	788,852	89,000	37,985	53,433	1,007,270	158,103
2020*	20%	203,138	448,000	80,000	119,000	850,138	160,000

Table 4 Definitions:
Water Year – March 1 to February 28 (29 Leap Year) *partial 2020 year
CVP Allocation – Final CVP water supply allocation for the year (100% = 1,150,000 AF)+(Reassignment = 46,948 AF)
Net CVP – CVP Allocation adjusted for carry over and rescheduled losses
Groundwater – Total groundwater pumped (see District's Deep Groundwater Report)
Water User Acquired – Private Landowner water transfers
Additional District Supply – Surplus water, supplemental supplies, and other adjustments.
Fallowed Acres – Agricultural land out of production

Source: WWD, 2020

Subbasin Characteristics

The Tulare Lake Hydrologic Region covers approximately 17,000 square miles including all of Kings and Tulare counties, and most of Fresno and Kern counties. Significant geographic features include the Temblor Range to the west, the Tehachapi Mountains to the south and the southern Sierra Nevada to the east. The Kings, Kaweah, Tule, and Kern Rivers drain the southern portion of the valley internally towards the Tulare drainage basin.

The Westside Subbasin is primarily located in Fresno County; a portion – including the entire Westlands Solar Park plan area – is in Kings County. The subbasin encompasses a surface area of approximately 622,215 acres (972 square miles) within the San Joaquin Valley (DWR, 2020). The Westside Subbasin is located between the Coast Range foothills on the west and the San Joaquin River drainage and Fresno Slough to the east. To the southwest is the Pleasant Valley Groundwater Subbasin, and to the west are Tertiary marine sediments of the Coast Ranges. To the north and northeast is the Delta-Mendota Groundwater Subbasin, and to the east and southeast are the Kings and Tulare Lake Groundwater subbasins, also subbasins of the San Joaquin Valley Basin.

The aquifer system comprising the Westside Subbasin consists of unconsolidated continental deposits of Tertiary and Quaternary age. These deposits form an unconfined to semi-confined upper aquifer and a confined lower aquifer. These aquifers are separated by an aquitard named the Corcoran Clay member of the Tulare Formation. The unconfined to semi-confined aquifer (upper zone) above the Corcoran Clay includes younger alluvium, older alluvium, and part of the Tulare Formation. These deposits consist of highly lenticular, poorly sorted clay, silt, and sand intercalated with occasional beds of well-sorted fine to medium grained sand. This clay layer ranges in thickness from 20 to 200 feet, underlies most of the District, and has extensive wells penetrating the clay which allows partial interaction between the zones (DWR, 2006). The depth to the top of the Corcoran Clay varies from approximately 500 feet to 850 feet (WWD, 2014). The confined aquifer (lower zone) consists of the lower part of the Tulare Formation and possibly the uppermost part of the San Joaquin Formation. This unit is composed of lenticular beds of silty clay, clay, silt, and sand interbedded with occasional strata of well-sorted sand. Brackish or saline water underlies the usable groundwater in the lower zone (DWR, 2006). Well yields are good with an average of 1,100 gallons per minute (gpm) and a maximum of 2,000 gpm (DWR, 2003a).

Flood basin deposits along the eastern portion of the subbasin have caused near surface soils to drain poorly thus restricting the downward movement of percolating water. This causes agriculturally applied water to build up as shallow water in the near surface zone. Areas prone to this buildup are often referred to as drainage problem areas (DWR, 2006).

Water quality in the lower water bearing zone varies. Typically, water quality varies with depth with poorer quality existing at the upper and lower limits of the aquifer and the optimum quality somewhere between. The upper limit of the aquifer is the base of the Corcoran Clay with the USGS identifying the lower limit as the base of the fresh groundwater. The quality of the groundwater below the base of fresh water can exceed 2,000 milligrams per liter (mg/L) total dissolved solids (TDS) which is too high for irrigating crops; the subbasin averages 520 mg/L TDS. In addition to high TDS, this subbasin can also contain selenium and boron that may affect usability as irrigation water.

Groundwater Level Trends

As shown in Table 5, lower aquifer groundwater levels were generally at their lowest levels in the late 1960's prior to the importation of surface water. The CVP began delivering surface water to the San Luis Unit in 1967-68. Water levels gradually increased to a maximum in about 1987-88, falling briefly during the 1976-77 drought and again during the 1987-92 drought.

Table 5. Groundwater Use and Elevation Change in Westlands Water District

Crop[1] Year	Pumped AF	Elevation FT	Elevation Change FT	Crop Year	Pumped AF	Elevation FT	Elevation Change FT
1956	964,000	-65	-13	1986	145,000	71	8
1957	928,000	-56	9	1987	159,000	89	18
1958	884,000	-29	27	1988	160,000	64	-25
1959	912,000	-77	-48	1989	175,000	63	-1
1960	872,000	-81	-4	1990	300,000	9	-54
1961	824,000	-96	-15	1991	600,000	-32	-41
1962	920,000			1992	600,000	-62	-30
1963	883,000			1993	225,000	1	63
1964	913,000			1994	325,000	-51	-52
1965	822,000			1995	150,000	27	78
1966	924,000	-134		1996	50,000	49	22
1967	875,000	-156	-22	1997	30,000	63	14
1968	596,000	-135	21	1998	15,000	63	0
1969	592,000	-120	15	1999	20,000	65	2
1970	460,000	-100	20	2000	225,000	43	-22
1971	377,000	-93	7	2001	215,000	25	-18
1972		-54	39	2002	205,000	22	-3
1973		-37	17	2003	160,000	30	8
1974	96,000	-22	15	2004	210,000	24	-6
1975	111,000	-11	11	2005	75,000	56	32
1976	97,000	-2	9	2006	15,000	77	21
1977	472,000	-99	-97	2007	310,000	35	-42
1978	159,000	-4	95	2008	460,000	-11	-46
1979	140,000	-13	-9	2009	480,000	-31	-20
1980	106,000	4	17	2010	140,000	9	40
1981	99,000	11	7	2011	45,000	49	40
1982	105,000	32	21	2012[2]	355,000	1	-48
1983	31,000	56	24	2013	638,000	-58	-59
1984	73,000	61	5	2014	655,000	-76	-18
1985	228,000	63	2	2015	660,000	-120	-44

Source: WWD, 2016a.
[1] Crop year is from October 1 of previous year to September 30 of current year.
[2] Starting with 2012, groundwater pumped is for Water Year (March 1 through February 28)

1998 water levels recovered nearly to the 1987-88 levels after a series of wet years. Reductions in surface water availability along with increases in groundwater pumping resulted in groundwater levels declining by as much as 200 feet in the years between 2010 and 2015. These declines, largely occurring in the lower aquifer, resulted in increased subsidence in some areas of the subbasin, particularly along portions of the San Luis Canal (DWR, 2020).

Recharge is primarily from seepage of Coast Range streams along the west side of the subbasin (approximately 30,000 to 40,000 afy) and deep percolation of surface irrigation. Secondary recharge to the upper aquifer (approximately 20,000 to 30,000 afy) and lower aquifer (150,000 to 200,000 afy) occurred from areas to the east and northeast as subsurface flows. WWD estimated the average deep percolation between 1978 and 1996 was 244,000 afy and applied groundwater between 1978 and 1997 was 193,000 afy (DWR 2006; DWR 2020; WWD 2016a).

Overdraft and the Groundwater Sustainability Plan

Westside Subbasin is considered by DWR to be a critically overdrafted subbasin. This designation was identified as a part of the Sustainable Groundwater Management Act of 2014 (SGMA) and Groundwater Sustainability Plan (GSP) process and was based on significant, on-going, and irreversible subsidence which was about 0.4 feet per year between 2007 and 2011 (DWR, 2015). Basins in critical overdraft must develop a GSP by January 31, 2020. As the primary water purveyor in the Westside Subbasin, Westlands Water District is the designated Groundwater Sustainability Agency (GSA) for the subbasin, and developed the GSP for the subbasin. The GSP for the Westside Subbasin was adopted by the WWD Board of Directors on January 8, 2020.

The purpose of the GSP is to characterize groundwater conditions in the subbasin, to evaluate and report on conditions of overdraft, to establish sustainability goals and sustainability management criteria, and to describe projects and management actions the GSA intends to implement to achieve sustainability by 2040 (DWR, 2020). The plans and progress toward meeting the sustainability goal - that the subbasin will be operated within its sustainable yield by 2040 and maintain sustainability through the entire planning and implementation horizon through 2070 - will be evaluated every five years. The resulting sustainable yield is discussed below and projects and management actions to achieve sustainability is discussed later in this chapter.

Aquifer's Ability to Recover

The reduction of CVP water and other surface supplies to the District over time has resulted in the construction of many new wells by farmers to obtain water to make up for the shortfall. There were 605 wells constructed within the District between 2000 and 2015. The total number of operational wells within the District in 2014 was 792 and 124 non-operational wells. Most of the information provided here on District groundwater conditions was obtained from the District's 2015 Deep Groundwater Report (WWD, 2016a) and 2012 Water Management Plan (WWD, 2013).

As presented in Table 5, prior to the delivery of CVP water into the District, the annual groundwater pumping ranged from 822,000 to 964,000 acre-feet during the period of 1953 to 1968. The majority of this pumping was from the aquifer below the Corcoran Clay causing the sub-Corcoran piezometric groundwater surface (groundwater surface) to reach the lowest recorded average elevation of 156 feet below mean sea level in 1967. The U.S. Geological Survey concluded that extraction of large quantities of groundwater prior to CVP deliveries resulted in compaction of water bearing sediments and caused land subsidence ranging from 1 to 24 feet between 1926 and 1972.

After CVP water deliveries began in 1968, the groundwater surface rose steadily until reaching 89 feet above mean sea level in 1987, the highest average elevation on record dating back to the early 1940's. The only exception during this period was in 1977 when a drought and drastic reduction of CVP deliveries resulted in groundwater pumping of approximately 472,000 acre-feet and an accompanying drop in the groundwater surface elevation of approximately 97 feet.

During the early 1990's, groundwater pumping increased due to reduced CVP water supplies due to drought and regulatory actions. Groundwater pumping reached an estimated 600,000 acre-feet annually during 1991 and 1992 when the District received only 25 percent of its contractual entitlement of CVP water. This increased pumping caused the groundwater surface to decline to 62 feet below mean sea level, the lowest elevation since 1977. DWR estimated the amount of subsidence since 1983 to be almost two feet in some areas of the District, with most of that subsidence occurring since 1989.

Based on data presented in Table 4 and Table 5, during 2011 to 2015, CVP allocations averaged 28 percent (320,771 acre-feet), total groundwater pumped was 2,353,000 acre-feet, and the groundwater surface elevation decreased 129 feet. The CVP allocations for 2014 and 2015 water year were 0 percent for both years and with the accompanying increase in groundwater pumped (655,000 acre-feet and 660,000 acre-feet, respectively), the groundwater surface decreased 62 feet over the two-year period to an average elevation of 120 feet below mean sea level.

In the project vicinity, the depth to the top of the Corcoran Clay in the project vicinity is approximately 650 to 700 feet. The elevation of the base of fresh groundwater is approximately -2200 feet mean sea level (WWD, 2015b).

Sustainable Yield

Sustainable yield is defined as "the maximum quantity of water, calculated over a base period representative of long-term conditions in the basin and including any temporary surplus, that can be withdrawn annually from a groundwater supply without causing an undesirable result". Using 2015 as baseline conditions, sustainable yield for the 2020 to 2040 projected period was determined and ensures this is a quantity of water that can be withdrawn annually from a groundwater supply without causing an undesirable result. The average of 270,000 afy was determined as the sustainable yield of the Westside Subbasin prior to projects and management actions being implemented. The historical groundwater budget for the 1989 through 2015 budget period was 300,000 afy (DWR, 2020).

WESTLANDS WATER DISTRICT SOLAR PROJECT SUPPLY AVAILABILITY

The District has stated it will provide PV solar projects an operational water supply of up to 5.0 afy per quarter section (160 acres) which equals 55 afy maximum supply available for the 1,759-acre Grape Solar site. Total operational demands of 31.7 afy (rounded to 32 afy) from Table 3 equates to 2.89 afy per ¼ section, well within WWD's maximum annual allowance of 5.0 afy/160 acres. Although the District has been able to meet its municipal and industrial untreated water demands in the past, in the event that the District cannot provide the project water supply, water can be obtained from the same local well proposed to be used for construction water demands.

WATER MANAGEMENT AGENCIES AND ACTIVITIES

The majority of the Westside Subbasin is in Fresno County, extending south into Kings County. The Westside Subbasin is almost entirely within the District service area. The District's management activities and projects related to water conservation and the Groundwater Sustainability Plan activities and the Fresno Area Regional Groundwater Management Plan are summarized here.

Westlands Water District

The District funds education and technology, enabling growers to effectively utilize water allotments through efficiencies. The District surveys the static water levels in the wells and the water quality and quantity of pumped groundwater as part of its Water Management Plan. A key component of the District's Water Management Plan is water conservation. This program consists of the following elements.

- Irrigation Guide for water requirements per crop
- Water Conservation and Management Handbook
- Workshops and meeting on water management information
- Technical assistance and conservation computer programs
- Meter repair and updated program
- Groundwater monitoring
- Pump efficiency tests
- Conjunctive use of supplies
- Irrigation System Improvement Program
- Satellite imagery purchased about once every two weeks

Projects and management actions developed for the Groundwater Sustainability Plan are aimed at preventing and managing chronic lowering of groundwater levels, and significant and unreasonable reduction of groundwater storage, land subsidence, and degradation of groundwater quality. Proposed projects and management actions were grouped into the following project categories and are described below. This information was obtained from the GSP.

1. Surface water imports
2. Initial allocation of groundwater extraction
3. Aquifer storage and recovery

4. Targeted pumping reductions (to reduce pumping near Check 16, 17, and 20)
5. Percolation basins

Surface Water Imports. The primary focus of the Surface Water Imports program is to increase surface water availability and reliability and to reduce the corresponding landowner reliance on groundwater within the Subbasin by fulfilling most of the agricultural, municipal, and industrial water demands within the Subbasin. Surface water deliveries will be obtained through existing CVP contracts and through water transfer and exchange projects. Increasing the supply of surface water will allow surface water to be used in lieu of groundwater leading to increased groundwater storage and levels. The increased delivery of surface water can further conjunctive use strategies.

Initial Allocation of Groundwater Extraction. The GSA has prepared a groundwater allocation framework to manage demand by equally distributing the total annual pumping from the Subbasin on the basis of land acreage overlying the Subbasin. The groundwater allocation program includes a "transition period" from 2022 to 2030, in which a uniform annual allocation is initially established at 1.3 acre-feet per acre and then subsequently reduced each year by 0.1 AF per acre until 2030 when the allocation would reach 0.5 AF per acre. The groundwater will be distributed based on per-acre land ownership for all qualifying lands.

Thus, every overlying landowner will have equal access to available groundwater subject to the sustainability requirements of the GSP and the avoidance of undesirable results. The allocation will not constitute a determination of common law water rights. Instead the distribution will ensure there are no long-term imbalances in the Subbasin water budget, increase pumping transparency, and provide more flexibility to water users for resources management that provides benefits not traditionally available under common law — e.g. banking of unused water, trading.

This WSA utilized the 2030 goal of 0.5 af/ac/yr as its available supply for 18 months of construction activities.

Aquifer Storage and Recovery. An aquifer storage and recovery program (ASR) involving the direct injection and subsurface storage of groundwater using agricultural wells has been proposed by the GSA to improve water supply reliability within the Subbasin. Landowners will voluntarily adopt the program in order to have the injected water contribute to the landowner's groundwater allocation.

Targeted Pumping Reductions. It is possible that the combination of other measures will not be sufficient individually or collectively to avoid significant and unreasonable land subsidence. When combined with cumulative Subbasin pumping, groundwater withdrawals near Checks 16, 17, and 20 of the San Luis Canal/California Aqueduct, may require focused management efforts. Consequently, the GSP proposes to offer or, if necessary to avoid significant and unreasonable land subsidence, to require surface water substitution to reduce groundwater pumping near the canal. In exchange for the reduction in pumping, the GSA may provide incentives to landowners included in this program. Participating landowners may be required to bear material unmitigated impacts in accepting the substitute surface water.

Percolation Basins. The GSA is proposing engaging in managed aquifer recharge through percolation basins in selected areas of the Subbasin to increase groundwater in storage. These basins would be constructed on GSA-owned land where the Corcoran Clay is not present. The basins would be used to store excess water and recharge the Upper Aquifer and Lower Aquifer. Currently, the GSA is investigating the feasibility of this project at potential sites located in the Subbasin (DWR, 2020).

Fresno Area Regional Groundwater Management Plan

The Fresno County Groundwater Management Plan was updated in 2006. Although the study area is primarily within the Kings Subbasin which does not extend to the WSP site, its activities will improve the management of the Westside Subbasin and it demonstrates active efforts towards increased supply reliability in the region. The regional groundwater management group of nine agencies and one private water company that prepared the plan is implementing activities to improve water resources management and reporting. Activities include: groundwater level monitoring, groundwater quality monitoring, land surface subsidence monitoring, and surface water monitoring on an ongoing basis. These agencies are constantly making improvements to improve groundwater recharge, increase water conservation and education savings, pursue groundwater banking, increase recycled water usage to reduce potable consumption, and other activities (Fresno 2017).

WATER SUPPLY RELIABILITY

SB 610 requires the consideration of supply availability under varying climatic conditions including normal water years and dry years. Reasonable assumptions can be made regarding availability and reliability under normal year and dry year scenarios based on available data and information for the project.

During single and multiple dry years when less CVP contract water is available, the District relies more on local groundwater resources, resulting in a temporary drawdown of the aquifer. As demonstrated, historically the basin generally recovers from these times of increased pumping when surface water availability is restored; however, there is some concern regarding subsidence reducing the overall capacity of the aquifer, particularly on the west side of the subbasin.

The GSP determined that the allocation of groundwater extraction goal of 0.5 af/ac/yr is to be gradually obtained by year 2030 (DWR, 2020). This more conservative number was used as available supply for the analysis of supplies and demands. The temporary groundwater supply required for construction of the Grape Solar Project will be provided from an agricultural well located near the project site within the WSP Master Plan area. The WSP Master Plan addressed the use of groundwater to meet construction water demands.

For construction of WSP Master Plan solar projects, groundwater in this unadjudicated basin is considered available and reliable under normal water years, a single dry water year, and multiple dry years, as shown in Table 6. Grape Solar Project's temporary demands are 176 AFY (during the 18 month construction period). Of the 1,759 acres of fallowed (or dry farmed) District-owned land, Grape Solar Project would temporarily represent a more intensive use of the land by applying water for dust control during construction (whereas no water is applied to this area currently). Based on the information provided in this WSA and the WSP Master Plan WSA, the annual water demand during construction of 176 AFY over 1,759 acres is significantly less than the available supply of 0.5 af/ac/yr and is not expected to result in adverse water supply reliability impacts.

Table 6. Grape Solar Project Supplies and Demands (afy)

	2020	2025	2030	2035	2040	2045
Normal Year Construction						
Groundwater Supply [1]	880	0	0	0	0	0
WWD Supply	0	0	0	0	0	0
Construction Demand [2]	*176*	*0*	*0*	*0*	*0*	*0*
Normal Year Operations						
Groundwater Supply	0	0	0	0	0	0
WWD Supply [3]	55	55	55	55	55	55
Operations Demand [4]	*32*	*32*	*32*	*32*	*32*	*32*
Single Dry Year Construction						
Groundwater Supply [1]	880	0	0	0	0	0
WWD Supply	0	0	0	0	0	0
Construction Demand [2]	*176*	*0*	*0*	*0*	*0*	*0*
Single Dry Year Operations						
Groundwater Supply	0	0	0	0	0	0
WWD Supply [3]	55	55	55	55	55	55
Operations Demand [4]	*32*	*32*	*32*	*32*	*32*	*32*
Multiple Dry Year Construction (Year 1, 2, 3)						
Groundwater Supply [1]	880	0	0	0	0	0
WWD Supply	0	0	0	0	0	0
Construction Demand [2]	*176*	*0*	*0*	*0*	*0*	*0*
Multiple Dry Year Operations (Year 1, 2, 3)						
Groundwater Supply	0	0	0	0	0	0
WWD Supply [3]	55	55	55	55	55	55
Operations Demand [4]	*32*	*32*	*32*	*32*	*32*	*32*

[1] The GSP sustainable yield of 0.50 af/ac/yr (on 1,759 acres = 880 afy) is assumed available within the WSP Master Plan area to meet temporary construction demands. Construction supply is available from a local agricultural well.
[2] From Table 2.
[3] WWD can provide up to 5.0 AFY per 160 acres from its CVP allocation augmented with other purchases and groundwater (WWD, 2017). Total project area of 1,759 acres equals 55 AFY available supply.
[4] From Table 3.

The amount of CVP contract water received by the District during any given year varies depending on climatic and hydrologic conditions, Delta constraints, and other factors. The District augments the contract water with transfers and other purchased supplies, and growers augment surface supplies through increased groundwater pumpage. During operation of the project, the long term water demand of 32 afy for operational uses such as panel cleaning, sheep watering, and ongoing operations would be met using water provided by WWD.

The District does not have a municipal and industrial (M&I) supply contract with USBR, but it does exercise provisions in its agricultural water service contract for supplying water for incidental agricultural water. These purposes include M&I water use for industrial and commercial operations, single family dwellings, and farm housing. Thus, WWD delivers untreated water to communities of Coalinga, Huron, and other M&I users. The WWD rules and regulations recognize solar facilities as an M&I use and therefore has a higher priority for CVP allocations. During dry years for example, a higher percentage is allocated to M&I than to agricultural uses (e.g., during 2014 the CVP had a 25 percent allocation for M&I versus 0 percent for agriculture).

WWD manages its supplies for long term supply reliability. It augments CVP contract water with local and purchased surface waters, which are supplemented by groundwater pumping by growers, as presented in Table 4, and WWD encourages the fallowing of lands during shortages. If for some reason District surface water supplies are not available to meet Grape Solar Project operational demands, groundwater would be pumped from local agricultural wells and trucked to the site for panel washing. Based on the information provided in this WSA, WWD water supplies (surface and or groundwater) to meet the operational demand of 32 afy and groundwater supplies to meet a temporary construction demand averaging 176 afy (for each of the two years of construction) under normal water years, a single dry water year, and multiple dry years, are considered available and reliable, as shown in Table 6.

In summary, sufficient water supply is available to meet Grape Solar Project construction and operational demands under normal, dry, and multiple dry year climatic conditions. As presented in the WSP Master Plan WSA, the total Master Plan area water demands will result in significantly less groundwater pumping of the Westside Subbasin during construction, and minimal to no groundwater pumping during solar facility operations after full buildout.

OTHER PLANNED SOLAR PROJECTS

Other planned uses in the Westside Subbasin consist almost entirely of other solar PV generation facilities. Currently, there are 15 completed or partially completed solar projects in the Kings County and Fresno County portions of the subbasin, plus an additional 17 solar projects with pending or approved conditional use permit applications at the counties. The total land area covered by these other projects is approximately 23,797 acres, with a total generating capacity of 3,913 MW. Based on an average construction water demand rate of 0.2 acre-feet/acre, these other projects would consume a total of 7,826 acre-feet during construction.

It is assumed that all construction water would be obtained from local groundwater sources within the subbasin, and it is expected that construction of each acre of solar project would take less than one year. The construction consumption rate of 0.2 acre-feet per acre would not exceed the groundwater basin sustainable yield of 0.5 af/ac/yr. Upon completion, operational water demands for Grape Solar Project would be approximately 0.02 af/ac/yr (0.0180 rounded). It is assumed that operational water for the other solar projects would be obtained from groundwater sources within the subbasin. These operational water demands would be well below the presumed sustainable yield for the groundwater basin.

In summary, neither the short-term construction of the other planned projects within the subbasin, nor the long-term operational water demands from each project, would be likely to exceed the sustainable yield of the groundwater basin. Therefore, the construction and operational water demands for the other planned projects in the subbasin could be met from existing groundwater sources without contributing to overdraft of the subbasin.

CHAPTER 4 – CONCLUSIONS

SUFFICIENCY FINDINGS

A lack of specific data for project site groundwater usage and replenishment rates (e.g., a water budget) makes it difficult to quantify baseline conditions regarding groundwater supply availability for construction demands. However, an analysis of the ability of the groundwater basin (based on District subbasin data) to meet projected temporary construction water demands of the Grape Solar Project was based on other factors. The primary consideration is that solar projects have rights to a reasonable use of groundwater supply from the groundwater basin they overlie and that the project construction demands of 176 AFY for two years are substantially less than the sustainable groundwater yield on a per acre basis for the District and the WSP Master Plan area, of which the Grape Solar Project is a part of.

The WWD CVP allocation is only about 50 percent reliable on average, but this supply is augmented with other sources, particularly during dry years. The groundwater basin available to individual landowners within WWD is in critical overdraft. However a reduction in agricultural water demands due to the solar projects associated with the WSP Master Plan will result in increased water supply reliability for other agricultural users within the District.

With consideration of these variables and conditions, it is concluded that groundwater supplies from the Westside Subbasin will meet construction demands for Grape Solar Project during the 18 month construction period, in addition to the demand of existing and other planned future solar park uses. District water supplies will meet projected operational water demands for Grape Solar Project over a 20 year planning horizon, in addition to the demand of existing and other planned future uses. No supply deficiencies are expected in normal, dry, and multiple dry years for the proposed project. This WSA was prepared in compliance with the California Water Code, as amended by SB 610.

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APPENDIX E-1

Phase I Environmental Site Assessment

Prepared by

Moore Twining Associates

February 2020

MOORE TWINING ASSOCIATES, INC.

PHASE I ENVIRONMENTAL SITE ASSESSMENT
GRAPE SOLAR
NEVADA AVENUE AND 25TH AVENUE
UNINCORPORATED AREA OF KINGS COUNTY, CALIFORNIA

Prepared For:
Mr. Bert Verrips, AICP
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2527 Fresno Street
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Project Number: C64409.0100

February 11, 2020

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GRAPE SOLAR
NEVADA AVENUE AND 25TH AVENUE
UNINCORPORATED AREA OF KINGS COUNTY, CALIFORNIA

EXECUTIVE SUMMARY

Moore Twining Associates, Inc. (Moore Twining) was retained by Mr. Bert Verrips to conduct a Phase I Environmental Site Assessment (Phase I ESA) for a large, rural property located generally north of Nevada Avenue and east and west of 25th Avenue in an unincorporated area of Kings County, west of the City of Stratford, California (Site). This Phase I ESA was conducted in general conformance with the methods and procedures described in the American Society for Testing and Materials (ASTM) "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process" (E1527-13), published November 2013.

This summary should be used in conjunction with the entire report. It should be recognized that details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the Site history and conditions. Please review the entire report for more information regarding Moore Twining's findings and opinions.

On-Site Summary

The Site is located generally north of Nevada Avenue and east and west of 25th Avenue in an unincorporated area of Kings County, west of the City of Stratford, California (Site). The Site has been assigned the following Kings County Assessor's Parcel Numbers (APNs): 026-320-010, -011, and -021 through -028; 026-330-032, -035, -037, -055, and -057.

According to Moore Twining's review of historical aerial photographs, the Site has been used for agricultural purposes since at least 1950. According to the documentation provided by Mr. Verrips, the Site has been owned by Westlands Water District for approximately fifteen years and has been occupied by winter wheat during the wet season and fallow fields during the dry season.

At the time of the Site reconnaissance, the Site comprised approximately 1,759 acres of agricultural fields and vacant land. Unlined agricultural canals were located along 25th Avenue trending north and south, and along Nevada Avenue trending east and west. In addition, three (3) lateral unlined canals were located throughout the Site, trending north and south. Overhead transmission lines were located along 25th Avenue, along the northern boundary of the Site, and along the eastern boundary of the Site.

Concrete standpipes with pumps and light blue irrigation pipes were observed throughout the Site. No staining or evidence of leakage was observed. According to Mr. Bert Verrips, a representative of Environmental Consulting Services, the piping observed on the Site is part of the Westlands Water District (WWD) water distribution system. Additionally, the WWD informed Mr. Verrips that the piping for the water distribution system is made of Techtite and not Transite.

One (1) pole-mounted transformer was observed at the southwest corner of the Site. No staining or leaking was observed.

Small quantities of trash were observed around the Site.

Eight (8) historic water wells were listed on the EDR Well Search Data Map. Two (2) wells were listed under the federal database and were reportedly installed in 1966. Six (6) wells were listed under the state database. Information regarding the installation dates of state wells or current status was not provided.

The Site was not listed on any regulatory databases in the EDR Report.

According to the National Wetlands Inventory, a Riverine habitat in the form of canals was mapped bordering and transecting the Site. A 70.08-acre lake habitat was mapped bordering the Site to the northwest.

Off-Site Summary

At the time of the Site Reconnaissance, the Site was bordered to the south by Nevada Avenue with agricultural fields beyond. The adjoining properties in all directions were agricultural fields.

There were no regulatory listings found within the search radius regarding environmental conditions.

Conclusions Summary

On behalf of Mr. Bert Verrips, Moore Twining performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM E1527-13 for a property located generally north of Nevada Avenue and east and west of 25th Avenue in an unincorporated area of Kings County, west of the City of Stratford, California. This assessment has revealed no evidence of Controlled Recognized Environmental Conditions (CRECs), Historic Recognized Environmental Conditions (HRECs), or Recognized Environmental Conditions (RECs).

Additional Considerations

The legal application of agricultural chemicals is not considered a REC by the Comprehensive Environmental Response, Compensation and Liability (CERCLA) act of 1980. The exemption is noted in *(4) Application of Pesticides*—Section 107(i) of the ASTM E1527-13 standard. However, a clause is noted in the exemption stating, "The pesticide exemption also contains a "savings clause" that provides that the cost recovery prohibition does not alter or modify any obligations or liability under any other federal or state law for damages, injury or loss resulting from a release of hazardous substances, or for the costs of removal or remedial actions of such hazardous substances." It has been Moore Twining's experience that persistent pesticides can exist in soils after long-term use of agricultural chemicals. From the historical documents researched, no information was discovered that would indicate illegal agricultural activities occurred at the Site. As the Site was used from at least the 1950's for agricultural purposes, persistent pesticides, and other related agricultural chemicals may exist in the soils at the Site. These constituents, even in low concentrations, can result in federal, state and local requirements for movement, disposal, assessment, and remediation. If present, costs could be incurred to address these conditions.

Mapped National Wetland Inventory areas appear on the Site. It should be noted that any development of the Site or modification to any of these areas may require additional permitting including, but not limited to, a 404 permit with the Army Corps of Engineers (ACOE) or a Streambed Alteration Permit with the Regional Water Quality Control Board and the ACOE.

Recommendations

It is Moore Twining's recommendation that, prior to the sale, purchase, and/or development of the property, the soil in the areas of former agricultural use should be sampled and analyzed to evaluate the potential for human health risk or special requirements for handling, disposal, assessment and remediation. The presence of pesticides or other constituents of concern in the soil could result in increased disposal fees, and costs for assessment and remediation depending on the concentration of the pesticides and/or other constituents of concern in soils at the Site.

When permitting for development, the wetlands should be discussed with the permitting agency to determine the impact of the wetlands on future development and use of the Site, and any requirements for mitigation, etc.

1.0 INTRODUCTION

Moore Twining Associates, Inc. (Moore Twining) was retained by Mr. Bert Verrips to conduct a Phase I Environmental Site Assessment (Phase I ESA) for a large, rural property located generally north of Nevada Avenue and east and west of 25th Avenue in an unincorporated area of Kings County, west of the City of Stratford, California (Site). This Phase I ESA was conducted in general conformance with the methods and procedures described in the American Society for Testing and Materials (ASTM) “Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process” (E1527-13), published November 2013.

1.1 Objective

The objective of this assessment was to identify Recognized Environmental Conditions (RECs) located at the Site or adjacent properties that could present material risk of harm to public health or to the environment. Recognized environmental conditions are defined in ASTM E1527-13 as the presence or likely presence of any hazardous wastes and/or substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into the ground, groundwater, or surface water of the property.

1.2 Scope of Services

This Phase I ESA was performed to evaluate the potential presence of environmental conditions that may have resulted from operations at the Site or at nearby properties. The assessment included a Site reconnaissance, a review of available documentation of land-use history for evidence of the use, storage and/or disposal of hazardous substances, and a review of available regulatory information. This Phase I ESA included the following tasks:

- A review of the current and past uses of the Site since 1933;

- A Site reconnaissance to assess evidence of current and/or past use or storage of toxic or hazardous material; on-Site ponds, landfills, drywells, waste streams or other disposal units; visible soil discoloration; aboveground or underground storage tanks; electrical transformers containing polychlorinated biphenyls (PCBs); and drums, barrels and other storage containers;

- Visual observation of adjacent properties in order to determine if current and/or historical operations associated with these properties may pose a threat to the subject Site;

- A review of available federal Environmental Protection Agency (EPA), state EPA and regulatory agency lists of known or potential hazardous waste sites or landfills, and sites currently under investigation for environmental violations in the Site area. Using area-profile services provided by Environmental Data Resources, Inc. (EDR), Moore Twining cataloged properties near the Site that have been identified on regulatory agency lists. Search criteria were in conformance with ASTM E1527-13;

- Contact with relevant municipal, county and state agencies to review readily available records and permits; and

- Preparation of this report to present our methods, findings and conclusions.

The Scope of Services specifically excluded cultural, archeological, and biological assessments, as well as, sampling and analysis for the potential presence of asbestos containing building materials, lead based paint, or an assessment for radon gas. In addition, the Scope of Services did not include the collection and/or analysis of any materials including air, soil, soil-gas, or groundwater samples.

1.3 Limitations and Limited Conditions

The purpose of an environmental assessment is to reasonably assess the potential for, or actual impact of, past practices on a given site that may pose an environmental impairment to the Site. No assessment is thorough enough to identify all potential environmental impairments at a given site. If environmental impairments have not been identified during the assessment, such a finding should not, therefore, be construed as a guarantee of the absence of such conditions on the Site, but rather the result of the services performed within the scope, limitations, and cost of the work performed.

The conclusions presented in this report are solely professional opinions based on information provided regarding the Site and the findings of the reconnaissance and records search. Information obtained from the aerial photography is an interpretation of features observed in the photographs. Actual conditions at the Site may have been different from those interpreted. Conclusions presented are based on conditions as they existed at the time the work was performed. Changes in existing conditions of the Site due to time lapse, natural causes, or operations adjacent to the Site may deem conclusions presented in this Phase I ESA report invalid, unless the changes are reviewed, and the conclusions reevaluated. Such conditions may require additional site reconnaissance and require field exploration and laboratory testing to assess if the conclusions are applicable considering the changed conditions.

This work was performed for the sole use of our client. Any reliance on this report by a third party is at such party's sole risk. Others who seek to rely on the findings have a duty to determine the adequacy of this report for their intended use, time, and location. Moore Twining does not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report. No other warranty, either expressed or implied, is made. The standard of practice is time-dependent. Services provided were performed consistent with generally accepted professional consulting principles and practices for environmental assessors at the time this work was performed. The findings and conclusions presented in this report are solely professional opinions derived in accordance with current standards of professional practice.

2.0 SITE DESCRIPTION

Information concerning the Site was obtained from a Site reconnaissance and a review of the documents referenced in Sections 4.0 and 5.0 of this report. The Site reconnaissance was conducted on January 23, 2020 by Ms. Cecilia Simpson, a representative of Moore Twining.

2.1 Location and Description of Property

The Site comprises approximately 1,759 acres of open agricultural fields and vacant parcels. The Site is located generally north of Nevada Avenue and east and west of 25th Avenue in an unincorporated area of Kings County, west of the City of Stratford, California (Site). The Site has been assigned the following Kings County Assessor's Parcel Numbers (APNs): 026-320-010, -011, and -021 through -028; 026-330-032, -035, -037, -055, and -057.

The listed owner for the Site is:
Westlands Water District

A Site location map is presented as Drawing 1, and a Site plan, which includes Site boundaries, is presented as Drawing 2 in Appendix A.

2.2 Physical and Environmental Setting of the Site

Environmental characteristics including topography, geology, soil, and hydrogeology were evaluated based on Site observations, and review of published literature and maps. The findings are summarized in the following table.

PHYSICAL SETTING INFORMATION FOR THE SUBJECT SITE AND SURROUNDING AREA		SOURCE
Location	Stratford, Kings County, California	EDR Report, January 6, 2020
Site Elevation	The Site elevation is approximately 230 feet above mean sea level.	
Topographic Gradient	Minimal sloping toward the east southeast.	
Closest Surface Water	Unlined canals transect and border the Site.	
Flood Plains[1]	According to FEMA DFIRM Flood Data provided by EDR, the Site is not located within a 100-year or a 500-year flood zone.	FEMA DFIRM Flood Data Map 06031C0300C
Wetlands	A Riverine habitat in the form of canals was mapped bordering and transecting the Site. A	National Wetlands Inventory https://www.fws.gov/wetlands/data/mapper.html

[1] This is for general locational information only. The data presented should not be used for development purposes, as a comprehensive flood zone study has not been conducted.

PHYSICAL SETTING INFORMATION FOR THE SUBJECT SITE AND SURROUNDING AREA		SOURCE
	70.08-acre lake habitat was mapped bordering the Site to the northwest.[2]	
General Soil Characteristics		
Soil Type	Lethent- Clay Loam	United States Department of Agriculture, Soil Survey website; http://websoilsurvey.sc.egov.usda.gov
Description	Soils are clayey, partially hydric, moderately well drained, and have very slow infiltration rates.	
Area Specific Geology/Hydrogeology Characteristics		
Geology	The Site is located within the southern portion of the San Joaquin Valley. The San Joaquin Valley forms the southern half of the Great Valley Geomorphic Province, a topographic and structural basin bound on the east by the Sierra Nevada and to the west by the Coast Range. The Sierra Nevada, a fault block dipping gently to the southwest, is composed of igneous and metamorphic rocks of pre-Tertiary age which comprise the basement complex beneath the valley. The subsurface of the Site and surrounding vicinity is characterized by a thick sequence of unconsolidated sediments from the Pleistocene epoch. Subsurface material beneath the Site is primarily composed of alluvial fan deposits and flood plain over-bank deposits including interbedded silts, sands, clays, and gravels.	(Wagner, 2002) (California Geologic Survey, 2010)
Hydrogeology	Recent groundwater and hydraulic gradient data was not available for the subject Site.	EDR Well Search Report
Oil and Gas Wells		
Current Oil and Gas Wells on Subject Site	No oil and/or gas wells were reported to be on the Site.	California Department of Conservation, Geologic Energy Management Division (CalGEM) web site http://www.conservation.ca.gov/dog/Pages/WellFinder.aspx
Historical Oil and Gas Wells on Subject Site	No historical oil and/or gas wells were reported to be located on the Site.	California Department of Conservation, CalGEM web site http://www.conservation.ca.gov/dog/Pages/WellFinder.aspx

[2] This is for general locational information only. The data presented should not be used for development purposes, as a comprehensive wetland study has not been conducted.

3.0 INFORMATION FROM THE SITE RECONNAISSANCE

The objective of the Site reconnaissance was to observe the Site for specific indicators of environmental conditions. The Site reconnaissance included a systematic search by vehicle of practically accessible areas of the Site and adjacent properties. Several dirt access roads traversed the Site at various locations and were used to scan the property from a slow moving vehicle. Areas that included structures or features of interest were searched by foot. A Site Plan depicting the Site, adjoining property use, and observed on-Site features is presented in Appendix A. Additionally, photographs were taken during the Site reconnaissance, and selected photographs of the Site are presented in Appendix B.

The Site reconnaissance was conducted on January 23, 2020 by Ms. Cecilia Simpson, a representative of Moore Twining. The findings of the Site reconnaissance are summarized in the following subsections.

3.1 Site Reconnaissance - Description of Structures, Roads, and Other Site Improvements

At the time of the Site reconnaissance, the Site comprised approximately 1,759 acres of agricultural fields and vacant land. Unlined agricultural canals were located along 25th Avenue trending north and south and along Nevada Avenue trending east and west. In addition, three (3) lateral unlined canals were located throughout the Site, trending north and south. Overhead transmission lines were located along 25th Avenue, along the northern boundary of the Site, and along the eastern boundary of the Site.

3.2 Current Uses of the Site

At the time of the Site reconnaissance, the Site comprised agricultural land and vacant parcels.

3.3 Current Uses of the Adjoining Properties

At the time of the Site reconnaissance, the Site was bordered to the south by Nevada Avenue with agricultural fields beyond. The adjoining properties in all directions were agricultural fields.

3.4 Site Reconnaissance - Specific Indicators of Environmental Conditions

In addition to the general description of the Site, specific indicators of environmental conditions were also evaluated for the Site. Observations made during the Site reconnaissance are summarized in the following table. Affirmative responses are discussed in more detail following the table.

Category	Feature	Observed
Interior (Not Applicable)	Elevators	N/A
	Air Compressors	N/A
	Incinerators	N/A
	Waste Treatment Systems	N/A
	Presses/Stamping Equipment	N/A
	Press Pits	N/A
	Hydraulic Lifts or Hoists	N/A
	Paint Booth	N/A

	Plating Tanks	N/A
	Lathes, Screw Machines, etc.	N/A
	Regulated Hazardous Materials Use and Storage	N/A
	Floor Drains and Similar Facilities	N/A
Aboveground Chemical or Other Waste Storage or Waste Streams	Aboveground Storage Tanks (ASTs)	No
	Drums, Barrels and/or Containers > than 5-gallons	No
	Chip Hoppers	No
	Hazardous or Petroleum Waste Streams	No
Underground Chemical or Waste storage, Drainage or Collection Systems	Underground Storage Tanks (USTs)	No
	Fuel Dispensers	No
	Sumps or Cisterns	No
	Dry Wells	No
	Oil/Water Separators	No
	Flood Drains, Trench Drains, etc.	No
	Pipeline Markers	**Yes**
Exterior Observations	Stressed Vegetation	No
	Stained Soil or Pavement	No
	Pad or Pole-Mounted Transformers and/or Capacitors	**Yes**
	Soil Piles of Unknown Origin	No
	Exterior Dumpsters with Staining	No
	Hydraulic Box Crushers	No
	Leachate or Other Waste Seeps	No
	Trash, Debris, and/or Other Waste Materials	**Yes**
	Uncontrolled Dumping or Disposal Areas	No
	Surface Water Discoloration, Sheen or Free Product	No
	Strong, Pungent or Noxious Odors	No
	Groundwater Wells	No
	Storm Water Retention or Detention Ponds	No
	Pits, Ponds or Lagoons	No

Concrete standpipes with pumps and light blue irrigation pipes were observed throughout the Site. No staining or evidence of leakage was observed.

One (1) pole-mounted transformer was observed at the southwest corner of the Site. No staining or leaking was observed.

Small quantities of trash were observed around the Site.

Other Specific Indicators of Environmental Conditions

No other specific indicators that would prompt an environmental concern were observed during the Site reconnaissance.

4.0 HISTORICAL AND CURRENT INFORMATION ON THE PROPERTY AND ADJOINING PROPERTIES

The history of land-use on and near the Site was determined from the review of historic aerial photographs, topographic maps, Sanborn maps, building permits, and historic city directories. The findings are summarized in the following subsections.

4.1 Aerial Photograph Review

Available historical aerial photographs of the Site and vicinity for the years 1937, 1940, 1950, 1960, 1976, 1984, 1994, 2005, 2009, 2012, 2016, and 2018 were reviewed for indications of past Site use and/or Site activities which may have involved the manufacture, generation, use, storage, and/or disposal of hazardous materials. The results of the aerial photograph review are summarized in the following table. Copies of the historical aerial photographs are included in Appendix D.

Year	Summary of Information
1937-1940 (EDR)	The Site appears as undeveloped land. Unpaved roads trend throughout the Site. The adjoining properties are also undeveloped land.
1950-2018 (EDR & Google Earth)	The Site and adjoining properties are occupied by row crop agriculture. 25th Avenue bisects the Site north and south. Nevada Avenue borders the Site to the south. Canals have been constructed alongside Nevada Avenue, 25th Avenue, and trending along other roads throughout the Site.

4.2 Topographic Map Review

Available topographic maps of the Site and vicinity for the years 1929, 1933, 1935, 1937, 1940, 1943, 1950, 1954, 1956, 1963, 1981, and 2012 were reviewed for indications of past Site use and/or Site activities which may have involved the manufacture, generation, use, storage, and/or disposal of hazardous materials. Copies of the historical topographic maps are included in Appendix D.

A review of the historical topographic maps did not prompt any environmental concerns.

4.3 Sanborn Fire Insurance Map Review

Sanborn maps were not available for the subject Site or surrounding areas.

4.4 Historical City Directory Review

City directories can provide information concerning past and current occupancy of the Site and adjacent areas. Historical city directory information was not provided for the Site.

4.5 Building Permits

Building records can provide a history of on-Site structures, features, and development. Building permits were not available due to the rural nature of the subject Site.

4.6 User Provided Information

This section summarizes information provided by the user that assisted in the identification of potential RECs associated with the Site.

4.6.1 Environmental Questionnaires

Moore Twining submitted an Environmental Questionnaire to Mr. Bert Verrips, a representative of Environmental Consulting Services. Mr. Verrips was unaware of any environmental concerns at the Site. Mr. Verrips did report that three (3) inactive oil/gas wells were present on adjoining property to the west of the Site.

According to the California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) web site, four (4) historical oil/gas wells were mapped approximately 2,455 feet, 3,790 feet, 5,157 feet, and 6,865 feet to the west of the Site. Two (2) of the wells were reported as idle and two (2) of the wells were reported abandoned as of 1954.

In an email dated March 31, 2020, Mr. Verrips informed Moore Twining that the light blue piping observed on the Site is part of the Westlands Water District (WWD) water distribution system. Additionally, the WWD informed Mr. Verrips that the piping for the water distribution system is made of Techtite and not Transite.

Moore Twining submitted an Environmental Questionnaire to Environmental Consulting Services for distribution to the Site owner. At the time this report was issued to the client, the completed questionnaire had not been returned to Moore Twining.

A copy of the questionnaire is included in Appendix E.

4.6.2 Previous Investigations

No reports of previous investigations were provided by the client or otherwise located; however, previous investigations have been conducted for properties located immediately to the north off-Site. Copies of the reports of the previous investigations are presented in Appendix E.

Off Site

Phase I Environmental Site Assessment prepared by Moore Twining – Chestnut Solar, dated May 20, 2019

Moore Twining conducted a Phase I ESA in May 2019 for a 1,040-acre parcel bordering the Site immediately to the north of the northeast half of the Site. The assessment revealed no evidence of CRCs, HRECs, or RECs; however, an additional consideration was included. Due to the possible presence of agricultural chemical in the soils at the Site, Moore Twining recommended soil sampling and analysis in the areas of former agricultural use to evaluate the potential for human health risk or special requirements for handling, disposal, assessment, and remediation.

Soil Sampling conducted by Moore Twining – Chestnut Solar, dated May 30, 2019

Moore Twining conducted soil sampling in May 2019 for a 1,040-acre parcel bordering the Site immediately to the north of the northeast half of the Site. Per the Client's request, three (3) soil borings (A1 through A3) were hand-augured on April 29, 2019 for collection of shallow soil samples to characterize organochlorinated pesticides (OCPs) and arsenic in soil. The soil samples were analyzed for OCPs by EPA Method 8081A and lead by EPA Method 6010B. Based on the results of the analytical testing, the soil samples did not contain concentrations of OCPs above the laboratory reporting limits. Moore Twining did not recommend any further action.

Phase I Environmental Site Assessment prepared by Moore Twining – Solar Blue, dated May 8, 2019

Moore Twining conducted a Phase I ESA in May 2019 for a 1,895-acre parcel bordering the Site immediately to the north of the northwest half of the Site. The assessment revealed no evidence of CRCs, HRECs, or RECs; however, two (2) additional considerations were identified in the report, including the possible presence of agricultural chemicals in the soils and the location of the high-pressure natural gas pipeline located on the Site. Due to the possible presence of agricultural chemical in the soils at the Site, Moore Twining recommended soil sampling and analysis in the areas of former agricultural use to evaluate the potential for human health risk or special requirements for handling, disposal, assessment, and remediation.

Soil Sampling conducted by Moore Twining – Solar Blue, dated May 30, 2019

Moore Twining conducted soil sampling in May 2019 for a 1,895-acre parcel bordering the Site immediately to the north of the northwest half of the Site. Per the Client's request, five (5) soil borings (B1 through B5) were hand-augured on April 29, 2019 for collection of shallow soil samples to characterize organochlorinated pesticides (OCPs) and arsenic in soil. Two (2) soil borings (S1 and S2) were hand-augured on April 29, 2019 for collection of shallow soil samples to characterize aerially deposited lead (ADL) generated by automobile traffic on entries to major roads. S1 and S2 were collected from the northern Site boundary on Laurel Avenue. At each boring location, soil samples were collected from 0.5-foot below surface grade (bsg).

The soil samples were analyzed for OCPs by EPA Method 8081A and lead by EPA Method 6010B. Based on the results of the analytical testing, the soil samples did not contain concentrations of OCPs above the laboratory reporting limits. Lead was detected at concentrations of 12 mg/kg in both samples S1 and S2. The detected concentrations are below the Human Health Risk Assessment (HHRA) for residential soils of 80 mg/kg and below the soluble threshold limit concentration of 5 milligrams/Liter (mg/L) for landfill sampling requirements. No other chemicals of concern were detected above the method detection limit. Moore Twining did not recommend any further action.

4.6.3 Title Documentation

Title documents, including a chain of title and/or title report, can provide the environmental professional with information regarding current and past ownership and information regarding environmental liens and/or land use and activity limitations.

No environmental liens or activity/use restrictions regarding the Site were located; however, title and/or judicial records were not provided by the client or reviewed.

4.6.4 Institutional and Engineering Controls/Land Use Limitations/Environmental Liens

Institutional and Engineering Controls can indicate the current and/or historical presence of recognized environmental conditions that required remedial activity at the Site.

No institutional and engineering controls, land use limitations or environmental liens related to remediation and/or cleanup were found as part of this assessment; however, title and/or judicial records were not provided by the client or reviewed.

4.7 Past Uses of the Property

According to Moore Twining's review of historical aerial photographs, the Site has been used for agricultural purposes since at least 1950. According to the documentation provided by Mr. Verrips, the Site has been owned by Westlands Water District for approximately fifteen years and has been occupied by winter wheat during the wet season and fallow fields during the dry season.

4.8 Past Uses of Adjoining Property

According to Moore Twining's review of historical aerial photographs, the Site was bordered in all directions by vacant land since before 1937. The adjoining properties have been used for agricultural purposes since at least 1950.

5.0 REGULATORY RECORDS REVIEW

Requests to review files for the Site were submitted to the Regional Water Quality Control Board (RWQCB), the Department of Toxic Substances Control (DTSC), and the Kings County Department of Public Health (KCDPH). Printouts and information from regulatory databases and agencies are included in Appendix C.

The RWQCB and the DTSC did not report any files for the Site. At the time this report was prepared, a response had not been received from the KCDPH.

5.1 Facilities Identified in the Regulatory Record Review

The information regarding the Site was obtained from the EDR report, the DTSC Envirostor website (http://envirostor.dtsc.ca.gov/, Envirostor), and the State Water Resource Control Board's GeoTracker website (http://geotracker.waterboards.ca.gov/, GeoTracker). At the time this report was issued to the client, the Site did not appear on the Envirostor or GeoTracker websites.

Eight (8) historic water wells were listed on the EDR Well Search Data Map. Two (2) wells were listed under the federal database and were reportedly installed in 1966. Six (6) wells were listed under the state database. Information regarding the installation dates of state wells or current status was not provided.

5.2 Facilities Identified in the EDR Report

Moore Twining contracted EDR to perform a search of available federal, state, and local database information systems for identifying known recognized environmental conditions present on the Site and nearby properties that have the potential to adversely impact the Site being assessed in this study. EDR's findings are summarized below. The complete report furnished by EDR is included in Appendix D of the report.

TABLE 1
SUMMARY OF REGULATORY LISTS SEARCHED BY EDR AND RECORDS REVIEWED*

Database	Target Site	Search Distance (Miles)	< 1/8	1/8 - ¼	1/4 - ½	½ - 1	> 1	Total Plotted
FEDERAL ASTM STANDARD								
NPL		1.000	0	0	0	0	NR	0
Proposed NPL		1.000	0	0	0	0	NR	0
NPL LIENS		TP	0	NR	NR	NR	NR	0
Delisted NPL		1.000	0	0	0	0	NR	0
Federal Facility		0.500	0	0	0	NR	NR	0
SEMS		0.500	0	0	0	NR	NR	0
SEMS Archive		0.500	0	0	0	NR	NR	0
CORRACTS		1.000	0	0	0	0	NR	0
RCRA-TSDF		0.500	0	0	0	NR	NR	0
RCRA Lg, Quan. Gen.		0.250	0	0	NR	NR	NR	0
RCRA Sm. Quan. Gen.		0.250	0	0	NR	NR	NR	0
RCRA-CESQG		0.250	0	0	NR	NR	NR	0
LUCIS		0.500	0	0	0	NR	NR	0
US ENG CONTROLS		0.500	0	0	0	NR	NR	0
US INST CONTROLS		0.500	0	0	0	NR	NR	0
ERNS		TP	0	NR	NR	NR	NR	0
STATE ASTM STANDARD								
RESPONSE		1.000	0	0	0	0	NR	0
ENVIROSTOR		1.000	0	0	0	0	NR	0
SWF/LF		0.500	0	0	0	NR	NR	0
LUST		0.500	0	0	0	NR	NR	0
INDIAN LUST		0.500	0	0	0	NR	NR	0
SLIC		0.500	0	0	0	NR	NR	0
FEMA UST		0.250	0	0	NR	NR	NR	0
UST		0.250	0	0	NR	NR	NR	0
AST		0.250	0	0	NR	NR	NR	0
INDIAN UST		0.250	0	0	NR	NR	NR	0
VCP		0.500	0	0	0	NR	NR	0
INDIAN VCP		0.500	0	0	0	NR	NR	0

TABLE 1 SUMMARY OF REGULATORY LISTS SEARCHED BY EDR AND RECORDS REVIEWED*								
Database	Target Site	Search Distance (Miles)	< 1/8	1/8 - ¼	1/4 - ½	½ - 1	> 1	Total Plotted
BROWNFIELDS		0.500	0	0	0	NR	NR	0

NR = Not Requested (Beyond Search Distance)
TP = Target Property
* = Table includes only databases required for ASTM E1527-13 compliance. Other databases are included in the EDR report and discussed in the following sections as appropriate.

5.2.1 On-Site

The Site was not listed on any regulatory databases in the EDR Report.

5.2.2 Off-Site

Moore Twining's review of the referenced databases also considered the potential or likelihood of contamination from adjoining and nearby properties impacting this Site. To evaluate which of the adjoining and nearby properties identified in the regulatory database report present an environmental risk to the subject Site, Moore Twining considered the following criteria:

- The type of database on which the property is identified;
- The topographic position of the property relative to the subject Site;
- The direction and distance of the property from the subject Site;
- Local soil conditions in the area of the Site;
- The known or inferred groundwater flow direction;
- The status of the respective regulatory agency-required investigation(s) of the identified property, if any; and
- Surface and subsurface obstructions and diversions (e.g., buildings, roads, sewer systems, utility service lines, rivers, lakes and ditches) located between the property and the subject Site.

No regulatory listings were reported for the area within the stated search radius regarding environmental conditions.

5.2.3 Orphan Properties

An Orphan Property is a listed property in the same zip code as the Site which cannot be mapped because of inadequate address information. Moore Twining reviewed fifty-one (51) reported Orphan Properties provided by EDR. The Orphan Properties are summarized in the following table:

Summary of Orphan Properties					
Listing	**Location**	**Database**	**Location Confirmed**	**Distance from Site**	**Risk, Rationale**
Department of Water Res: Check #22-25th Avenue	25th Avenue, Bakersfield, CA	CUPA Listings	Yes	71 miles	No, distance from Site
Shell Pipeline-Kettleman Pump Station	West end of 4th Street	CUPA Listings	Yes	9 miles	No, distance from Site
Check #20.5-Milham Road	0.35 miles north of Milham Road	CUPA Listings	Yes	9 miles	No, distance from Site
Check #21-Milham Road	0.2 miles north of Milham Road	CUPA Listings	Yes	9 miles	No, distance from Site
Pacific Gas & Electric	½ mile west of 30th ½ mile south of Omaha	HAZNET	Yes	5.3 miles	No, distance from Site
35 Q Disposal Site	3 miles east of Kettleman City	WMUDS/ SWAT	Yes	9 miles	No, distance from Site
(No Listing)	½ mile south of Kettleman City Highway	CHMIRS	Yes	9.5 miles	No, distance from Site
Kettleman Station	Highway 41, ½ mile north of interstate	RCRA-LQG	Yes	8.5 miles	No, distance from Site
Dudleyridge Farms	25th Avenue	RCRA-SQG, FINDS, ECHO, HAZNET	Yes	9 miles	No, distance from Site
(No Listing)	½ mile south of Kettleman City on Highway 41	ERNS	Yes	10 miles	No, distance from Site
(No Listing)	½ mile down 25th Avenue	ERNS	Yes	10 miles	No, distance from Site
(No Listing)	¼ mile south of Kettleman on Highway 41	ERNS	Yes	9.25 miles	No, distance from Site
Beacon Oil	1.5 miles southwest of Kettleman City	Envirostor, HIST CORTESE	Yes	10.5 miles	No, distance from Site
Kettleman Station	½ mile south of Kettleman City	AST	Yes	9.5 miles	No, distance from Site

Summary of Orphan Properties					
Listing	**Location**	**Database**	**Location Confirmed**	**Distance from Site**	**Risk, Rationale**
Sandridge Field Fuel Storage Sites	East of Highway 33	AST	Yes	15.4 miles	No, distance from Site
Sandridge Ritchie Farms Site	25th Avenue and Salem	AST	Yes	9 miles	No, distance from Site
Kettleman City Sanitary Landfill	South of Kettleman City	WMUDS/ SWAT	Yes	9.4 miles	No, distance from Site
Chevron UST, Inc.	Bull Wheel Road approximately 4 miles south of Kettleman City	DEED	Yes	13 miles	No, distance from Site
(No Listing)	Northbound I-5, north of Utica	CHMIRS	Yes	14.1 miles	No, distance from Site
(No Listing)	½ mile down 25th Avenue, pole number 15/07	CHMIRS	Yes	16.5	No, distance from Site
(No Listing)	25th Avenue 2.5 miles south of Utica Avenue	CHMIRS	Yes	16 miles	No, distance from Site
(No Listing)	30th Avenue about a mile south of Plymouth Avenue	CHMIRS	Yes	5.5 miles	No, distance from Site
(No Listing)	Southbound I-5, north of state route 41	CHMIRS	Yes	11.4 miles	No, distance from Site
(No Listing)	Corner of 9th and Millham	CHMIRS	Yes	9 miles	No, distance from Site
(No Listing)	On Paris east of 32nd	CHMIRS	Yes	6.5 miles	No, distance from Site
Kettleman Pump Station	½ mile south of Kettleman City	FINDS, WMUDS/ SWAT, CHMIRS	Yes	9.5 miles	No, distance from Site
Utica North Orchardsna LLC	25684 25th Avenue	FINDS	Yes	10 miles	No, distance from Site
Robison Prezioso Inc.	½ mile south of Kettleman City	HAZNET	Yes	9.5 miles	No, distance from Site
Pacific Gas & Electric	1 mile southeast of Kettleman City	HAZNET	Yes	10 miles	No, distance from Site

Summary of Orphan Properties					
Listing	**Location**	**Database**	**Location Confirmed**	**Distance from Site**	**Risk, Rationale**
1x Rainbow Express	Interstate 5 & 41 end of ward	HAZNET	Yes	11 miles	No, distance from Site
Henrietta Tulare Lake 70KV Reconductor	Nevada Avenue	NPDES	No	Unknown	No, nature of listing. No violations reported.
TPJ Two 1	South of Utica Avenue and west of 6th Avenue	NPDES	Yes	22.5 miles	No, distance from Site
Hickey 1	South of Pueblo Avenue and west of 10th Avenue	NPDE	Yes	4 miles	No, distance from Site
Zodiac No 4 thru 9	East of state highway 41, south of Quebec Avenue	CIWQS	Yes	6 miles	No, distance from Site
Zodiac No 1 to 10	East of state highway 41, south of Quebec Avenue	CIWQS	Yes	6 miles	No, distance from Site
(No Listing)	North side of Dover Avenue and east of Highway 43	CDL	Yes	15.8 miles	No, distance from Site
(No Listing)	67750 Bailey Road, 600 yards west of domestic sewage pond, Mountain Pass, CA	CHMIRS	Yes	245 miles	No, distance from Site
(No Listing)	1,500 feet west of 20 ½ Avenue	ERNS	Yes	3 miles	No, distance from Site
Super Kat, Inc. II	Nevada Avenue	HIST UST	No	Unknown	No, two (2) 4,000-gallon gasoline USTs and one (1) 1,500-gallon waste oil UST were installed in 1983. No violations reported.
Westfarmers	Corner of Avenal Cutoff Road and	HIST UST	Yes	2.4 miles	No, distance from Site
(No Listing)	Highway 41 just south of Nevada Avenue	CHMIRS	Yes	0.45 miles	No, distance from Site

Summary of Orphan Properties					
Listing	**Location**	**Database**	**Location Confirmed**	**Distance from Site**	**Risk, Rationale**
(No Listing)	Westside of Quebec Avenue and 6th Avenue	CHMIRS	Yes	18.7 miles	No, distance from Site
(No Listing)	Avenue 20, ¼ mile north of Quebec	CHMIRS	Yes	6 miles	No, distance from Site
Esajian Farming Co.	Northwest corner of Gale Avenue and Avenal Cut-off Road	RCRA NonGen/ NLR, FINDS, ECHO	Yes	3 miles	No, distance from Site
Stone Land Co.	28521 Nevada Avenue	RCRA NonGen/ NLR, CUPA Listings	Yes	3.2 miles	No, distance from Site
Lakeshore Dairy	15978 Manteca Avenue	FINDS	Yes	7.6 miles	No, distance from Site
Lemoore NAS Lemoore Auxiliary Field	Nevada Avenue	FINDS	Yes	7 miles	No, distance from Site
Pacific Gas & Electric	1,500 feet west of 20 ½ Avenue	HAZNET	Yes	3 miles	No, distance from Site
(No Listing)	½ mile south of Kettleman City Highway 41	CHMIRS	Yes	9.5 miles	No, distance from Site
(No Listing)	Southwest corner of Section 19, Township 22, RA 19 E, ½ mile south of Kettleman City off Highway 41	CHMIRS	Yes	9.5 miles	No, distance from Site
Utica North Orchards, LLC	25684 25th Avenue	CUPA Listings	Yes	4 miles	No, distance from Site

Forty-nine (49) of the provided Orphan Property locations were confirmed and determined to be located in positions considered to be cross gradient, downgradient, or hydrologically isolated from the Site, or were beyond the applicable ASTM search parameters.

Two (2) of the provided Orphan Property locations were unable to be confirmed. One listing was from the NPDES database for construction stormwater permitting in 2011. The next listing was from the Historical UST database for the installation of two (2) 4,000-gallon gasoline USTs and one (1) 1,500-gallon waste oil

UST installed in 1983. No violations were reported for the USTs. Based on review of aerial photographs, no gas stations have been located near the Site.

It is considered a low potential that the Orphan Sites have adversely impacted the environmental condition of the Site.

6.0 SUMMARY OF FINDINGS AND OPINIONS

The findings of the Phase I ESA are summarized in the following sections:

6.1 On-Site

The Site is located generally north of Nevada Avenue and east and west of 25th Avenue in an unincorporated area of Kings County, west of the City of Stratford, California (Site). The Site has been assigned the following Kings County Assessor's Parcel Numbers (APNs): 026-320-010, -011, and -021 through -028; 026-330-032, -035, -037, -055, and -057.

According to Moore Twining's review of historical aerial photographs, the Site has been used for agricultural purposes since at least 1950. According to the documentation provided by Mr. Verrips, the Site has been owned by Westlands Water District for approximately fifteen years and has been occupied by winter wheat during the wet season and fallow fields during the dry season.

At the time of the Site reconnaissance, the Site comprised approximately 1,759 acres of agricultural fields and vacant land. Unlined agricultural canals were located along 25th Avenue trending north and south and along Nevada Avenue trending east and west. In addition, three (3) lateral unlined canals were located throughout the Site, trending north and south. Overhead transmission lines were located along 25th Avenue, along the northern boundary of the Site, and along the eastern boundary of the Site.

Concrete standpipes with pumps and light blue irrigation pipes were observed throughout the Site. No staining or evidence of leakage was observed. According to Mr. Bert Verrips, a representative of Environmental Consulting Services, the piping observed on the Site is part of the Westlands Water District (WWD) water distribution system. Additionally, the WWD informed Mr. Verrips that the piping for the water distribution system is made of Techtite and not Transite.

One (1) pole-mounted transformer was observed at the southwest corner of the Site. No staining or leaking was observed.

Small quantities of trash were observed around the Site.

Eight (8) historic water wells were listed on the EDR Well Search Data Map. Two (2) wells were listed under the federal database and were reportedly installed in 1966. Six (6) wells were listed under the state database. Information regarding the installation dates of state wells or current status was not provided.

The Site was not listed on any regulatory databases in the EDR Report.

According to the National Wetlands Inventory, a Riverine habitat in the form of canals was mapped bordering and transecting the Site. A 70.08-acre lake habitat was mapped bordering the Site to the northwest.

6.2 Off-Site

At the time of the Site Reconnaissance, the Site was bordered to the north by Nevada Avenue with agricultural fields beyond. The adjoining properties in all directions were agricultural fields.

There were no regulatory listings found within the search radius regarding environmental conditions.

6.3 Data Gaps, Limitations, and Deviations

Data gaps are described as a lack of or inability to obtain information required by the standards and practices listed in ASTM E1527-13, despite good faith efforts by the environmental professional or prospective landowner.

At the time this report was issued to the client, the completed environmental questionnaire had not been received from the property owners. This is considered a data gap.

Chain of title and environmental lien information was not provided by the client. This is considered a deviation from the Standard. Based on the nature of the Site, this is not considered a significant data gap.

The material content of this report is intended to be consistent with a standard of practice as defined by ASTM E1527-13. However, the report format differs in style, arrangement, and presentation of material facts from the format described by ASTM.

7.0 CONCLUSIONS AND RECOMMENDATIONS

On behalf of Mr. Bert Verrips, Moore Twining performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM E1527-13 for a property located generally north of Nevada Avenue and east and west of 25th Avenue in an unincorporated area of Kings County, west of the City of Stratford, California. This assessment has revealed no evidence of Controlled Recognized Environmental Conditions (CRECs), Historic Recognized Environmental Conditions (HRECs), or Recognized Environmental Conditions (RECs).

Additional Considerations

The legal application of agricultural chemicals is not considered a REC by the Comprehensive Environmental Response, Compensation and Liability (CERCLA) act of 1980. The exemption is noted in *(4) Application of Pesticides*—Section 107(i) of the ASTM E1527-13 standard. However, a clause is noted in the exemption stating, “The pesticide exemption also contains a “savings clause” that provides that the cost recovery prohibition does not alter or modify any obligations or liability under any other federal or state law for damages, injury or loss resulting from a release of hazardous substances, or for the costs of removal or remedial actions of such hazardous substances.” It has been Moore Twining’s experience that persistent pesticides can exist in soils after long-term use of agricultural chemicals. From the historical documents researched, no information was discovered that would indicate illegal agricultural activities occurred at the Site. As the Site was used from at least the 1950's for agricultural purposes, persistent pesticides, and other related agricultural chemicals may exist in the soils at the Site. These constituents, even in low concentrations, can result in federal, state and local requirements for movement, disposal, assessment, and remediation. If present, costs could be incurred to address these conditions.

Mapped National Wetland Inventory areas appear on the Site. It should be noted that any development of the Site or modification to any of these areas may require additional permitting including, but not limited to, a 404 permit with the Army Corps of Engineers (ACOE) or a Streambed Alteration Permit with the Regional Water Quality Control Board and the ACOE.

Recommendations

It is Moore Twining's recommendation that, prior to the sale, purchase, and/or development of the property, the soil in the areas of former agricultural use should be sampled and analyzed to evaluate the potential for human health risk or special requirements for handling, disposal, assessment and remediation. The presence of pesticides or other constituents of concern in the soil could result in increased disposal fees, and costs for assessment and remediation depending on the concentration of the pesticides and/or other constituents of concern in soils at the Site.

When permitting for development, the wetlands should be discussed with the permitting agency to determine the impact of the wetlands on future development and use of the Site, and any requirements for mitigation, etc.

8.0 CLOSING

Moore Twining Associates, Inc. performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM E1527-13 for the subject Site. Any exceptions to, or deletions from, this practice are described Section 6.3 of this report.

We appreciate the opportunity to be of service to Mr. Verrips on this project. Please contact our office at (800) 268-7021 if you have any questions regarding this report.

Sincerely,
MOORE TWINING ASSOCIATES, INC.
Environmental Services Division

Cecilia Simpson
Phase I Assessment Project Manager

Katie Lister PG, QSD
Environmental Division Manager

"I declare that, to the best of my knowledge and belief, I meet the definition of Environmental Professional. I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312."

9.0 REFERENCES

American Society for Testing and Materials. (2013). *ASTM Standards of Environmental Site Assessments for Commercial Real Estate, E1527-13, 2nd ed.* West Conshohocken, Pennsylvania: ASTM International.

California Geologic Survey. (2010). *Geologic Map of California 1:750,000 Scale.*

Environmental Data Resources, Inc. (January 6, 2020). *Grape Solar, Stratford, CA Inquriy Number: 05922312.2r.* Environmental Data Resources, Inc.

Moore Twining Associates, Inc. (May 20, 2019). *Phase I Environmental Site Assessment Chestnut Solar Project.*

Moore Twining Associates, Inc. (May 30, 2019). *Soil Sampling and Pesticide Analysis Chestnut Solar Project.*

Moore Twining Associates, Inc. (May 30, 2019). *Soil Sampling and Pesticide Analysis Solar Blue Project.*

Moore Twining Associates, Inc. (May 8, 2019). *Phase I Environmental Site Assessment Solar Blue Project.*

Wagner, D. (2002). *Note 36: Geomorphic Map of California.* California Geologic Survey.

10.0 QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS

Moore Twining Associates, Inc. Phase I Environmental Site Assessment staff is composed of a group of environmental professionals that perform Environmental Site Assessments on a routine basis. The Phase I ESA staff is managed and supervised by individuals who conduct, prepare, oversee, and/or review Environmental Site Assessments on a daily basis. Qualification profiles for these individuals are provided in the following section.

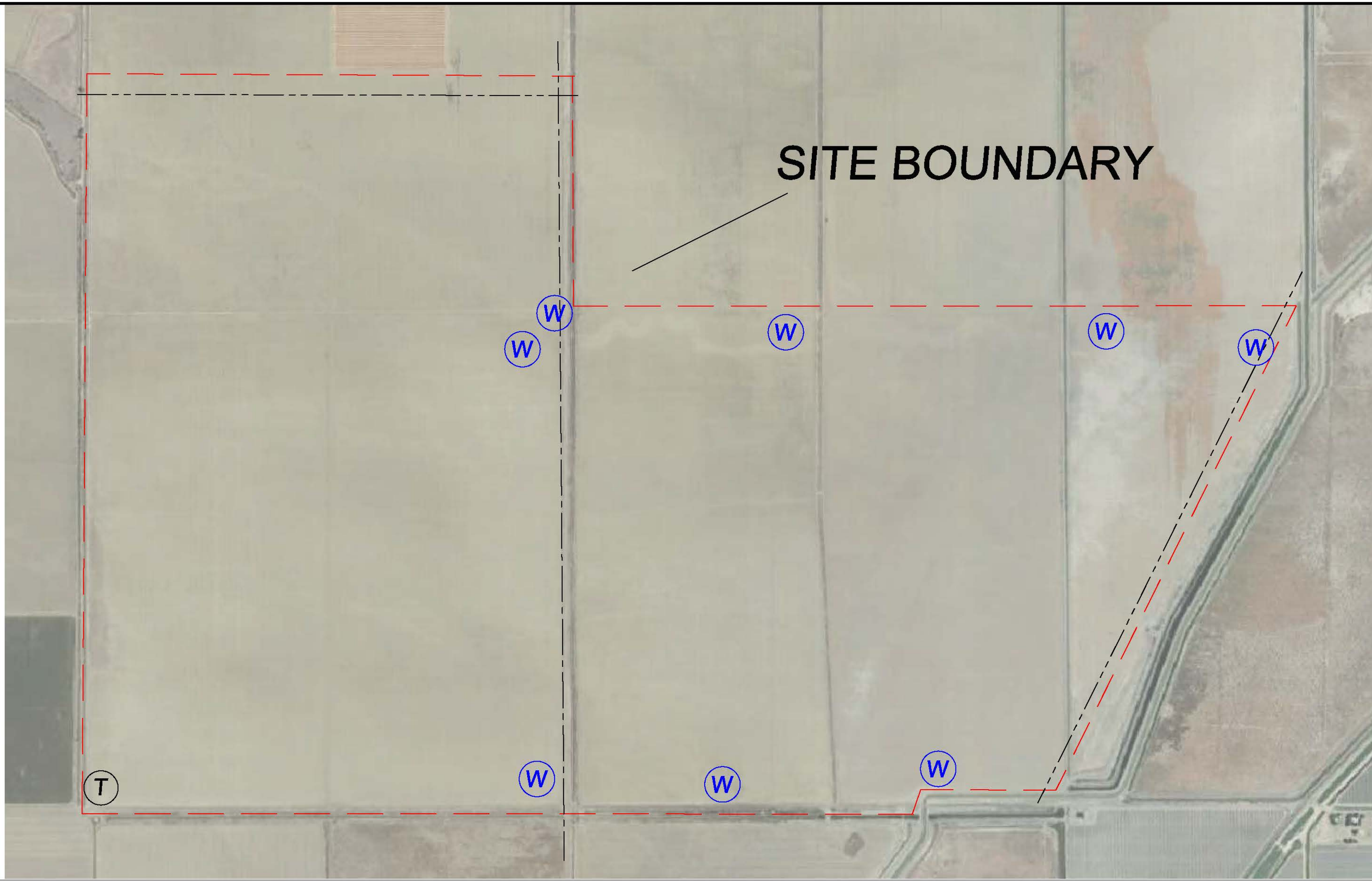
Reviewed by
Katie Lister PG, QSD
Environmental Division Manager

Mrs. Lister has sixteen years of experience conducting Phase I Environmental Site Assessments, Phase II assessment work, and Phase III remediation. Mrs. Lister has conducted environmental site assessments for a number of different project types including pesticide production facilities, shopping centers, gas stations, school sites, mines, large vacant properties, and agricultural sites.

APPENDIX A

DRAWINGS

SITE LOCATION MAP GRAPE SOLAR PROJECT 25TH AVENUE AND NEVADA AVENUE KINGS COUNTY, CALIFORNIA	FILE NO. Site Loc Map	DATE DRAWN: 1/31/2020	MOORE TWINING ASSOCIATES, INC.
	DRAWN BY: CS	APPROVED BY:	
	PROJECT NO. C64409.0100	DRAWING NO. 1	



T	TRANSFORMER	
W	EDR MAPPED WELL	——·—·—— POWERLINES

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0 550
APPROXIMATE SCALE IN FEET

MOORE TWINING ASSOCIATES, INC.

GRAPE SOLAR PROJECT
25TH AVENUE AND NEVADA AVENUE
KINGS COUNTY, CALIFORNIA

FILE NO.	DATE DRAWN: 4/22/2020
DRAWN BY: CS	APPROVED BY:
PROJECT NO. C64409.0100	DRAWING NO. 1

APPENDIX B

SITE PHOTOGRAPHS


Unpaved canal along Nevada Avenue to south of Site facing west

1


Unpaved canal along Nevada Avenue to south of Site facing east

2

Electrical transmission lines at east boundary of Site

3

Irrigation pipes in unpaved canal on Site

4

Example of buried pipeline marker on Site

5


Example of standpipe with steel cap along south boundary of Site

6


Example of concrete standpipe on Site

7


Unlined canal on Site

8

General view of Site facing west

9

View along 25th Avenue bisecting Site facing north

10


Example of concrete standpipe and irrigation pipes in north area of Site

11


Example of minimal trash on Site

12

General view of Site

13

Concrete standpipes and general view of Site

14


Pole mounted transformer at southwest corner of Site

15


View from southwest corner of Site facing north

16

APPENDIX C

REGULATORY AGENCY DOCUMENTATION

Cecilia Simpson

From: Martin, Kelly@Waterboards <Kelly.Martin@Waterboards.ca.gov>
Sent: Thursday, January 09, 2020 9:35 AM
To: Cecilia Simpson
Subject: Public Records Request Dated 1/9/2020

To Cecilia Simpson,

Central Valley Regional Water Quality Control Board does not have records for the following location:

- East and West of 25th Avenue and north of Nevada Avenue, Lemoore, Ca (1,753).

Thank You,

Kelly Martin
Scientific Aid
Central Valley Regional Water Quality Control Board
Fresno Office
(559) 444-2489
Kelly.Martin@Waterboards.ca.gov

APPENDIX E-2

<u>Soil Sampling and Pesticide Analysis</u>

Prepared by

Moore Twining Associates

February 2020

February 7, 2020 C64409.01

Mr. Bert Verrips, AICP
Environmental Consulting Services
11942 Red Hill Avenue
Santa Ana, California 92705

RE: Soil Sampling and Pesticide Analysis
Grape Solar Project
Kings County, California

Dear Mr. Verrips:

This letter presents the results and findings of limited Phase II to investigate soils at a property located east and west of 25th Avenue and north of Nevada Avenue in an unincorporated area of Kings County, west of the City of Stratford, California (Site). It is Moore Twining Associates, Inc. (Moore Twining) understanding that this investigation was requested by you as part of your due diligence for the subject property related to development of the Site.

The purpose of the soil sampling and analysis was to assess if persistent pesticides are present in on-Site soil that exceed human health or waste disposal screening levels, and if aerially deposited lead was present in soils near the planned Site entryways.

SOIL SAMPLING METHODS

Three soil borings (S-1 through S-3) were hand-augured on January 23, 2020 for collection of shallow soil samples to characterize organochlorinated pesticides (OCPs) and arsenic in soil. Soil boring locations are shown on the attached drawing. At each boring location, soil samples were collected from 0.5-foot below surface grade (bsg) and 1.5 feet bsg.

One soil borings (ADL 1) was hand-augured on January 23, 2020 for collection of shallow soil samples to characterize aerially deposited lead (ADL) generated by automobile traffic on entries to major roads. ADL 1 was collected from the southern Site boundary on Nevada Avenue. At the boring location, a soil sample was collected from 0.5-foot below surface grade (bsg).

Soil samples were collected from the specified depths by driving a pre-cleaned stainless-steel sleeve into the undisturbed soil using a slide-hammer soil sampler. The sleeve was subsequently capped with Teflon sheets and plastic caps, labeled with the sample date/time and a unique soil sample number, placed in a chilled ice chest, and delivered under chain of custody (COC) documentation to Moore Twining's Laboratory. The soil samples were analyzed for OCPs by EPA Method 8081A and for arsenic and/or lead by EPA Method 6010B. The number and location of the samples was specified by the client.

RESULTS AND RECOMMENDATIONS

Arsenic was reported in S-1 through S-3 ranging from 5.6 to 12 mg/kg. These concentrations exceed the Department of Toxic Substances Control (DTSC) screening levels (0.11 mg/kg residential and 0.42 mg/kg commercial) however the DTSC has acknowledged that background concentrations of arsenic in California soils can average 12 mg/kg in some areas. As such, the elevated concentrations on the Site would not generally require cleanup to screening levels.

Lead was detected at concentrations of 9.5 mg/kg in the ADL 1Gr sample. The detected concentration is below the Human Health Risk Assessment (HHRA) for residential soils of 80 mg/kg and below the soluble threshold limit concentration of 5 milligrams/Liter (mg/L) for landfill sampling requirements. No other chemicals of concern were detected above the method detection limit. A copy of the laboratory report and Moore Twining's chain of custody is included with this letter.

Moore Twining does not recommend any further action.

LIMITATIONS

The scope of the investigation undertaken to conduct this soil characterization screening was intended to be an interactive process. The purpose of an environmental assessment is to reasonably characterize existing Site conditions based on field observations and laboratory analytical data. In performing such a study, it is understood that a balance must be struck between a reasonable inquiry into the Site conditions and an exhaustive analysis of each conceivable environmental characteristic.

Conditions of interest may exist at the Site that cannot be identified by visual observations and the scope of the work performed as part of this analysis. Where subsurface exploratory work was performed, our professional opinions were based in part on interpretation of data from discrete sampling locations that may not represent actual conditions or un-sampled locations. If conditions of interest were not identified during performance of the work, such a finding should not be construed as a guarantee that such conditions do not exist at the Site.

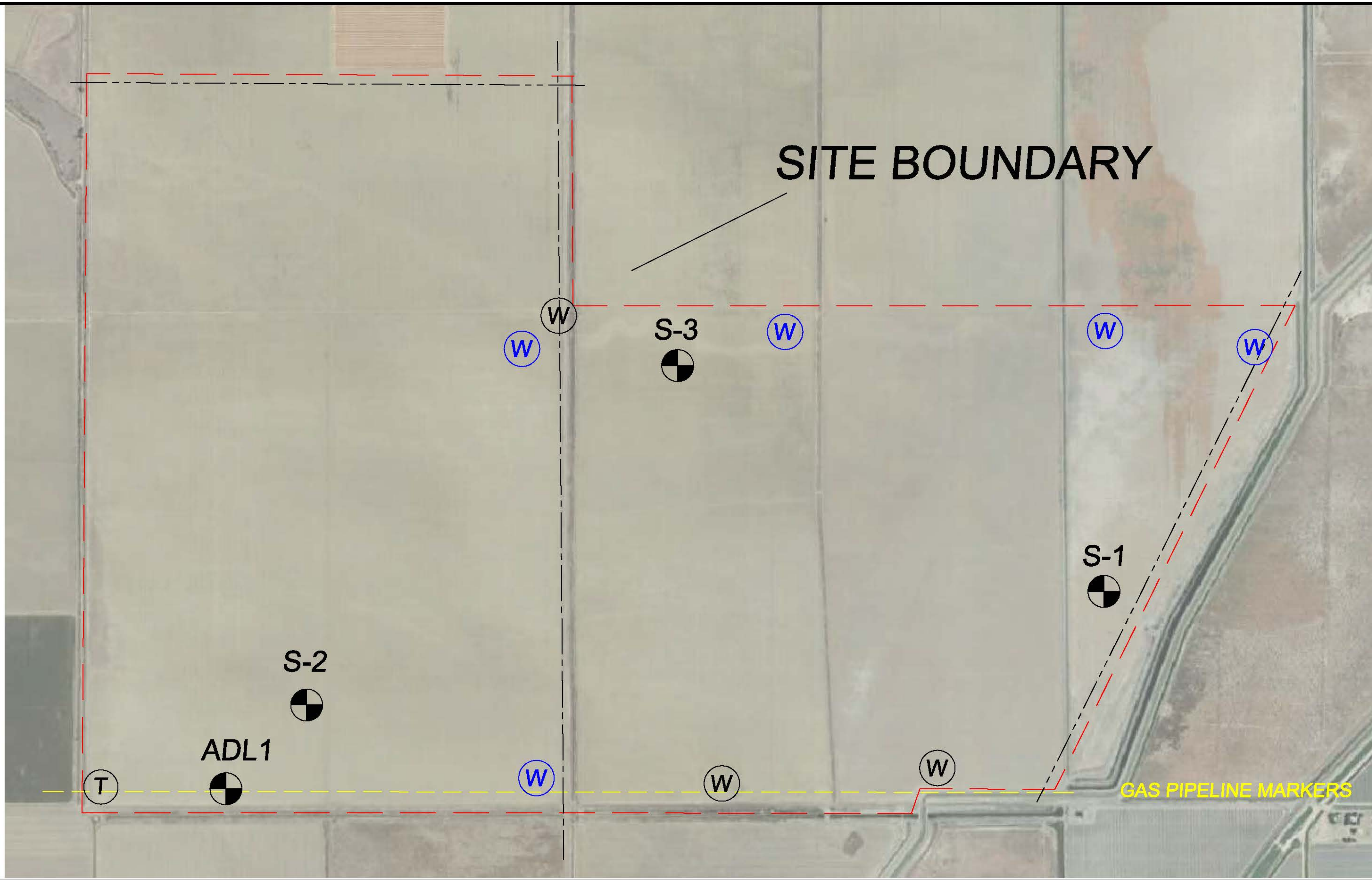
This work was conducted in accordance with generally accepted engineering principles and practices in at the time the work was performed. This warranty is in lieu of all other warranties, either expressed or implied. This report was prepared for the sole use of the client and appropriate regulatory agencies. Any reliance on this report by a third party is at such party's sole risk.

CLOSING

We appreciate the opportunity to be of service to you on this project. Please contact our office at (800) 268-7021 if you have any questions regarding this report.

Sincerely,
MOORE TWINING ASSOCIATES, INC.
Environmental Services Division

Cecilia Simpson
Phase I Assessment Project Manager



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T TRANSFORMER
BORING LOCATION
W EDR MAPPED WELL
POWERLINES

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APPROXIMATE SCALE IN FEET

MOORE TWINING ASSOCIATES, INC.

GRAPE SOLAR PROJECT
25TH AVENUE AND NEVADA AVENUE
KINGS COUNTY, CALIFORNIA

FILE NO.	DATE DRAWN: 1/31/2020
DRAWN BY: CS	APPROVED BY:
PROJECT NO. C64409.0100	DRAWING NO. 1

MOORE TWINING ASSOCIATES, INC.
California ELAP Certificate #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

February 06, 2020

Work Order #: **GA23025**

Cecilia Simpson
MTA Environmental Division
2527 Fresno Street
Fresno, CA 93721

RE: Env. Consultant, Grape Solar

Enclosed are the analytical results for samples received by our laboratory on **01/23/20** . For your reference, these analyses have been assigned laboratory work order number **GA23025**.

All analyses have been performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, Moore Twining Associates, Inc. (MTA) is not responsible for use of less than complete reports. Results apply only to samples analyzed.

If you have any questions, please feel free to contact us at the number listed above.

Sincerely,

Moore Twining Associates, Inc.

Susan Federico
Client Services Representative

MOORE TWINING ASSOCIATES, INC.
California ELAP Certificate #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

MTA Environmental Division	**Project:** Env. Consultant, Grape Solar	**Reported:**
2527 Fresno Street	**Project Number:** 1201-19	02/06/2020
Fresno CA, 93721	**Project Manager:** Cecilia Simpson	

Analytical Report for the Following Samples

Sample ID	Notes	Laboratory ID	Matrix	Date Sampled	Date Received
S-1 1'		GA23025-01	Soil	01/23/20 09:52	01/23/20 15:50
S-2 1'		GA23025-03	Soil	01/23/20 10:29	01/23/20 15:50
S-3 1'		GA23025-05	Soil	01/23/20 10:50	01/23/20 15:50
ADL 1		GA23025-07	Soil	01/23/20 11:36	01/23/20 15:50

MOORE TWINING ASSOCIATES, INC.
California ELAP Certificate #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

MTA Environmental Division	**Project:**	Env. Consultant, Grape Solar	**Reported:**
2527 Fresno Street	**Project Number:**	1201-19	02/06/2020
Fresno CA, 93721	**Project Manager:**	Cecilia Simpson	

S-1 1'

GA23025-01 (Soil)   Sampled: 01/23/20 09:52

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Metals (Total)									
Arsenic		**5.6**	2.0	mg/kg	1	B0A2703	01/29/20	01/29/20	EPA 6010B
Semi-Volatile Organics									
8081A Twining									
4,4´-DDD		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
4,4´-DDE		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
4,4´-DDT		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Aldrin		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
alpha-BHC		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
alpha-Chlordane		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
beta-BHC		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Chlordane (tech)		ND	0.036	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
delta-BHC		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Dieldrin		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Endosulfan I		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Endosulfan II		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Endosulfan sulfate		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Endrin		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Endrin aldehyde		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Endrin ketone		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
gamma-BHC (Lindane)		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
gamma-Chlordane		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Heptachlor		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Heptachlor epoxide		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Methoxychlor		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Toxaphene		ND	0.020	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Trifluralin		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Surr: Decachlorobiphenyl (DCB)		*103%*	*Recovery Limits: 11.4% - 122%*			*B0B0404*	02/04/20	02/04/20	*EPA 8081A*
Surr: Tetrachloro-meta-xylene (TMX)		*101%*	*Recovery Limits: 8.5% - 170%*			*B0B0404*	02/04/20	02/04/20	*EPA 8081A*

S-2 1'

GA23025-03 (Soil)   Sampled: 01/23/20 10:29

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Metals (Total)									
Arsenic		**12**	2.0	mg/kg	1	B0A2703	01/29/20	01/29/20	EPA 6010B
Semi-Volatile Organics									
8081A Twining									
4,4´-DDD		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
4,4´-DDE		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
4,4´-DDT		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Aldrin		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
alpha-BHC		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
alpha-Chlordane		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
beta-BHC		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A

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MTA Environmental Division 2527 Fresno Street Fresno CA, 93721	**Project:** Env. Consultant, Grape Solar **Project Number:** 1201-19 **Project Manager:** Cecilia Simpson	**Reported:** 02/06/2020

S-2 1'

GA23025-03 (Soil) Sampled: 01/23/20 10:29

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Semi-Volatile Organics									
8081A Twining									
Chlordane (tech)		ND	0.036	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
delta-BHC		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Dieldrin		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Endosulfan I		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Endosulfan II		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Endosulfan sulfate		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Endrin		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Endrin aldehyde		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Endrin ketone		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
gamma-BHC (Lindane)		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
gamma-Chlordane		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Heptachlor		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Heptachlor epoxide		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Methoxychlor		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Toxaphene		ND	0.020	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Trifluralin		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Surr: Decachlorobiphenyl (DCB)		*113%*	*Recovery Limits: 11.4% - 122%*			*B0B0404*	02/04/20	02/04/20	*EPA 8081A*
Surr: Tetrachloro-meta-xylene (TMX)		*103%*	*Recovery Limits: 8.5% - 170%*			*B0B0404*	02/04/20	02/04/20	*EPA 8081A*

S-3 1'

GA23025-05 (Soil) Sampled: 01/23/20 10:50

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Metals (Total)									
Arsenic		**10**	2.0	mg/kg	1	B0A2703	01/29/20	01/29/20	EPA 6010B
Semi-Volatile Organics									
8081A Twining									
4,4´-DDD		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
4,4´-DDE		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
4,4´-DDT		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Aldrin		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
alpha-BHC		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
alpha-Chlordane		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
beta-BHC		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Chlordane (tech)		ND	0.036	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
delta-BHC		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Dieldrin		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Endosulfan I		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Endosulfan II		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Endosulfan sulfate		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Endrin		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Endrin aldehyde		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Endrin ketone		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A

MOORE TWINING ASSOCIATES, INC.
California ELAP Certificate #1371

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Fresno, CA 93721
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MTA Environmental Division 2527 Fresno Street Fresno CA, 93721	**Project:** Env. Consultant, Grape Solar **Project Number:** 1201-19 **Project Manager:** Cecilia Simpson	**Reported:** 02/06/2020

S-3 1'

GA23025-05 (Soil) Sampled: 01/23/20 10:50

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Semi-Volatile Organics									
8081A Twining									
gamma-BHC (Lindane)		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
gamma-Chlordane		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Heptachlor		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Heptachlor epoxide		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Methoxychlor		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Toxaphene		ND	0.020	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Trifluralin		ND	0.010	mg/kg	1	B0B0404	02/04/20	02/04/20	EPA 8081A
Surr: Decachlorobiphenyl (DCB)		*92.6%*	*Recovery Limits: 11.4% - 122%*			*B0B0404*	02/04/20	02/04/20	*EPA 8081A*
Surr: Tetrachloro-meta-xylene (TMX)		*80.5%*	*Recovery Limits: 8.5% - 170%*			*B0B0404*	02/04/20	02/04/20	*EPA 8081A*

ADL 1

GA23025-07 (Soil) Sampled: 01/23/20 11:36

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Metals (Total)									
Lead		**9.5**	2.0	mg/kg	1	B0A2703	01/29/20	01/29/20	EPA 6010B

Notes and Definitions

µg/L	micrograms per liter (parts per billion concentration units)
mg/L	milligrams per liter (parts per million concentration units)
mg/kg	milligrams per kilogram (parts per million concentration units)
ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
	Analysis of pH, filtration, and residual chlorine is to take place immediately after sampling in the field. If the test was performed in the laboratory, the hold time was exceeded. **(for aqueous matrices only)**

MOORE TWINING ASSOCIATES, INC.

CHAIN OF CUSTODY / ANALYSIS REQUEST

2527 FRESNO STREET • FRESNO, CA 93721 • PHONE (559) 268-7021 • FAX: (559) 268-0740

ANALYTICAL CHEMISTRY DIVISION
CALIFORNIA ELAP CERTIFICATION # 1371

WORK ORDER #: GA23025
PAGE 1 OF 2

REPORT TO:	☐ INVOICE TO: ☐ REPORT COPY TO:	REPORTING:
ATTENTION: Cecilia Simpson	ATTENTION: Cecilia Simpson	☒ STANDARD FORMAT ☐ PDF
COMPANY NAME: Moore Twining	COMPANY NAME: Moore Twining	☐ EDT (SWRCB) ☐ EXCEL
ADDRESS: 2527 Fresno Street	ADDRESS: 2527 Fresno Street	☐ GEOTRACKER/COELT (LUFT) GLOBAL ID:
Fresno, CA 93721	Fresno, CA 93721	☐ COUNTY ENVIRONMENTAL HEALTH:
PHONE: 559-268-7021	PHONE: 559-268-7021	☐ STATE WATER RESOURCES CONTROL BOARD:
EMAIL / FAX: CeciliaS@mooretwining.com	EMAIL / FAX: CeciliaS@mooretwining.com	☐ OTHER:

SAMPLE INFORMATION

SAMPLED BY (PRINT): Cecilia Simpson

SIGNATURE: Cecilia Simpson

☐ PUBLIC SYSTEM ☒ ROUTINE
☐ PRIVATE WELL ☐ REPEAT
☐ OTHER ☐ REPLACEMENT

TURN AROUND TIME
☒ STANDARD
☐ RUSH, DUE ON:

SAMPLE TYPES

SOLID:
BS - BIOSOLID
CR - CERAMIC
SL - SOIL/SOLID
LIQUID:
DW - DRINKING WATER
GW - GROUND WATER
OL - OIL
SF - SURFACE WATER
ST - STORM WATER
WW - WASTEWATER

PROJECT INFORMATION

CONTRACT / P.O. NO.:

PROJECT: Env. Consult, Grape Solar

PROJECT NUMBER: 1201-19

PROJECT MANAGER: Cecilia Simpson

ANALYSIS REQUESTED

NOTES ON RECEIVED CONDITION:
☐ CUSTODY SEAL(S) BROKEN ☐ SAMPLES(S) DAMAGED
☑ ON ICE ☐ AMBIENT TEMP. ☐ INCORRECT PRESERVATION
5.1°c

LAB USE	CLIENT SAMPLE ID	DATE	TIME	TYPE	OCPs (EPA 8081A)	Arsenic (EPA 6010B)	Total Lead 6010B	On Hold							STATION CODE
1	S-1 1'	1/23/20	9:52 A	SL	x	x									
2	S-1 2'	1/23/20	9:56	SL				x							
3	S-2 1'	↓	10:29	SL	x	x									
4	S-2 2'	↓	10:33	SL				x							
5	S-3 1'	↓	10:50	SL	x	x									
6	S-3 2'	↓	10:55	SL				x							
7	ADL 1	↓	11:36	SL			x								

COMMENTS / ADDITIONAL INSTRUCTIONS:

RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY
Cecilia Simpson		1-23-20	1550	[illegible signature]	MTA

Sample Integrity Page 2 of 2 WO# GA23025 MTA Bottles: Yes or No

COC Info

Was temperature within range? Chemistry ≤6°C Micro <10°C Temp____°C	Yes No N/A	Did all bottle labels agree with COC?	Yes No N/A	Were there bubbles in VOA vials? (Volatiles Only)	Yes No N/A
If samples were taken today, is there evidence that chilling has begun? Recvd____C°	Yes No N/A	Was a sufficient amount of sample received?	Yes No N/A	Was PM notified of discrepancies? PM: By/Time:	Yes No N/A
Did all bottles arrive unbroken and intact?	Yes No N/A	Were correct containers and preservatives received for the tests requested?	Yes No N/A		
Do samples have a hold time <72 hours?	Yes No N/A				

Bottles Received

125ml (A) 250ml (B) 1Liter (C) 40ml VOA (V)	1-6	7
Bactl $Na_2S_2O_3$		
None (P)		
Cr6 Buffer (P) Borate Carbonate Buffer		
HNO_3 (P)		
H_2SO_4 (P)		
NaOH (P)		
NaOH+ZnAc (P)		
Dissolved Oxygen 300ml (P)		
None (AG)		
None (CG) 500ml		
$Na_2S_2O_3$ 250ml (Brown P) 549		
$Na_2S_2O_3$ (AG)		
$Na_2S_2O_3$ (AG)		
Thio/K Citrate		
NH_4Cl (AG) 552		
HCl (AG)		
None (CG) 500ml		
H_3PO_4 (AG)		
Other:		
Plastic Bag		
Low Level Hg/Metals Double Bag		
Client Own		
Glass Jar: 125/ 250/ 500		1
Soil Tube: Brass/ Steel/ Plastic	1	
5 g Encore		

Comments

Filter or Split	Container	Preservative	Date/Time/Initials
S P F			
S P F			
S P F			
S P F			
S P F			

Labeled by: W @ 1621 Labels checked by: M @ 1622

FL-SC-0003-06