Final Environmental Impact Report

Brawley Solar Energy Facility Project

SCH No. 2021070424

Imperial County, California

January 2023

Prepared for

County of Imperial 801 Main Street El Centro, CA 92243

Prepared by

HDR

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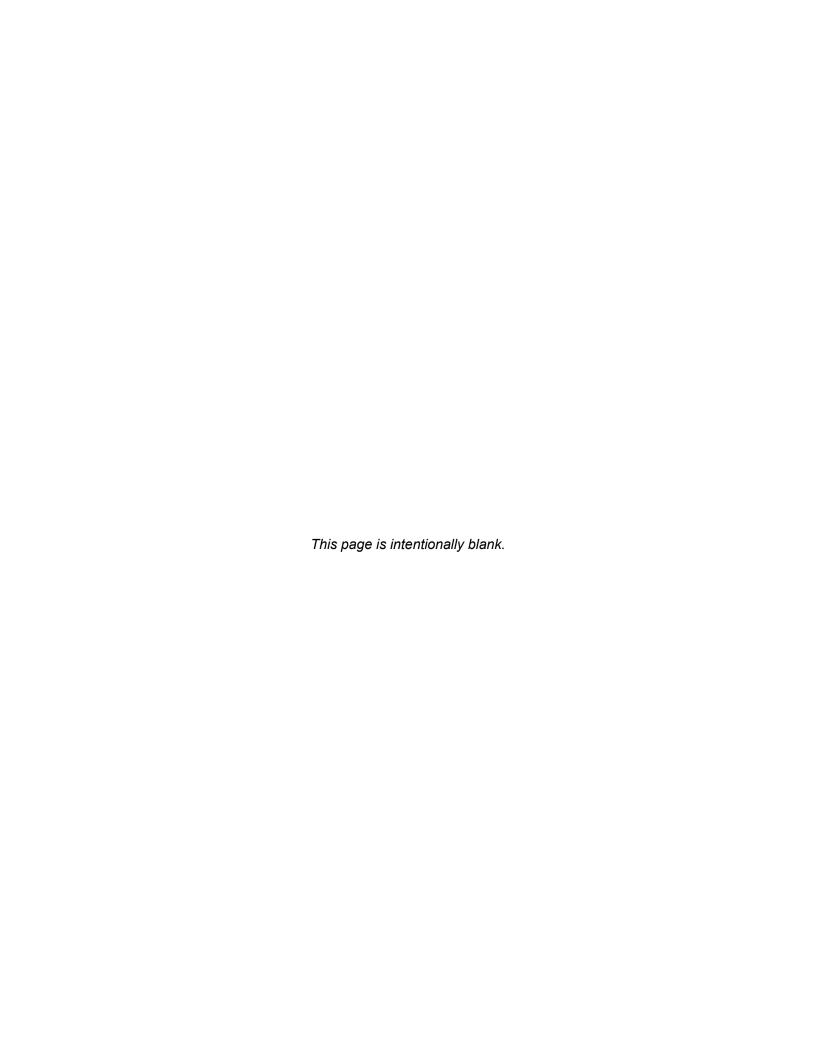


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Appendix A. Initial Study and Notice of Preparation and Comment Letters

Appendix B. Visual Impact Assessment

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Appendix D. Biological Technical Report

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Appendix I. Noise Impact Analysis

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Acronyms

AAM Annual Arithmetic Mean

AB Assembly Bill
AC alternating current
ADT average daily traffic

AF acre feet

AFY acre feet per year

ALUCP Airport Land Use Compatibility Plan

APEHA Alguist-Priolo Special Studies Earthquake Hazards Act

APLIC Avian Powerline Interaction Committee

APM Applicant Proposed Measure
APN Assessor's Parcel Numbers
AQAP air quality attainment plan
AQMP air quality management plan
ATCM airborne toxics control measure

BESS battery storage system
BMP Best Management Practices
BMS Battery Management System

B.P. before present burrowing owl CAA Clean Air Act

CAAQS California Ambient Air Quality Standards
CAFÉ Corporate Average Fuel Economy
CalEEMod California Emissions Estimator Model

CAPCOA California Air Pollution Control Officers Association

CARB California Air Resources Board
CBC California Building Code
CCAA California Clean Air Act

CCR California Code of Regulations

CDFG California Department of Fish and Game
CDFW California Department of Fish and Wildlife
CEQA California Environmental Quality Act
CESA California Endangered Species Act

CFC chlorofluorocarbons

CFR Code of Federal Regulations
CGS California Geologic Survey

CH₄ methane

CO carbon monoxide CO₂ carbon dioxide

CUP conditional use permit

CRHR California Register of Historical Resources

CRIT Colorado River Indian Tribes
CUPA Certified Unified Program Agency

CWA Clean Water Act DC direct current

DDT dichlorodiphenyltrichloroethane
DOC Department of Conservation
DOT Department of Transportation
DPM diesel particulate matter
EIR environmental impact report

EO Executive Order

EOP Emergency Operations Plan
EPA Environmental Protection Agency

ESA Endangered Species Act

FACW facultative wetland

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FEMA Federal Emergency Management Agency

FESA Federal Endangered Species Act
FGC California Fish and Game Code
FIRM Flood Insurance Rate Map

FMMP Farmland Mapping and Monitoring Program

GHG Greenhouse gas

HAP Hazardous Air Pollutant HCP Habitat Conservation Plan

HFC Hydrofluorocarbons

HMMP hazardous material management program

HRA health risk assessment

HU hydrologic unit HUC hydrologic unit code

HSC California Health and Safety Code
HVAC heating, ventilation, and air conditioning
ICAPCD Imperial County Air Pollution Control District

ICFD Imperial County Fire Department

ICPDS Imperial County Planning and Development Services Department

IEEE Institute of Electrical and Electronics Engineers

IID Imperial Irrigation District

IPCC International Panel on Climate Change

IRWMP Imperial Integrated Regional Water Management Plan

IS Initial Study

IVAG Imperial Valley Association of Governments

IVT Imperial Valley Transit
IWSP Interim Water Supply Policy
KOP key observation points

kV kilovolt

KVA kilo volt amperes

LCFS low carbon fuel standard

LOS level of service

LUST leaking underground storage tank

MBTA Migratory Bird Treaty Act

MEER Mechanical and Electrical Equipment Room

MLD most likely descendant

MMTCO₂e million metric tons of CO₂ equivalent MPO metropolitan planning organization

MW megawatt N₂O nitrous oxides

NAAQS National Ambient Air Quality Standards
NAHC Native American Heritage Commission
NCCP Natural Community Conservation Plan

NEHRP National Earthquake Hazards Reduction Program

NFIP National Flood Insurance Program
NFPA National Fire Protection Association
NHPA National Historic Preservation Act

NHTSA National Highway Traffic Safety Administration

NMFS National Marine Fisheries Service

NOI Notice of Intent
NO_X nitrogen dioxide
NOP notice of preparation

NPDES National Pollutant Discharge Elimination System

NRHP National Register of Historic Places

NWI National Wetlands Inventory

 O_3 ozone

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OES Office of Emergency Services

OHP California Office of Historic Preservation

OHWM ordinary high water mark
O&M operations and maintenance
OPR Office of Planning and Research

OSHA Occupational Safety and Health Administration

PCB Polychlorinated biphenyls
PCE passenger-car-equivalent
PCS Power Conversion Station

PFC Perfluorocarbons

PM₁₀ particulate matter less than 10 microns in diameter PM_{2.5} particulate matter less than 2.5 microns in diameter

PPA power purchase agreement

PPM parts per million

PRC Public Resources Code

PV photovoltaic RE Renewal Energy

REG Renewable Energy/Geothermal

ROG reactive organic gases

ROW right-of-way

RPS Renewables Portfolio Standard RTP Regional Transportation Plan

RWQCB Regional Water Quality Control Board SAA Streambed Alteration Agreement

SARA Superfund Amendments and Reauthorization Act

SB Senate Bill

SCADA Supervisory Control and Data Acquisition

SCAG Southern California Association of Governments SCAQMD South Coast Air Quality Management District

SCE Southern California Edison

SCIC South Coastal Information Center SCS Sustainable Communities Strategy

SIP State Implementation Plan

SO₂ sulfur dioxide SR State Route

SSAB Salton Sea Air Basin

SWPPP stormwater pollution prevention plan
SWRCB State Water Resources Control Board

TAC toxic air contaminants
TMDL total maximum daily load

U.S. United States

USACE United States Army Corps of Engineers

UL Underwriters Laboratory USC United States Code

USFWS United States Fish and Wildlife Service

VOC volatile organic compounds
VMT vehicle miles traveled

WEAP Worker Environmental Awareness Program

WPLT Western Pluvial Lakes Tradition

WSA water supply assessment

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0.1 Introduction and Summary

This Final Environmental Impact Report (EIR) has been prepared in accordance with the California Environmental Quality Act (CEQA) as amended (Public Resources Code Section 21000 et seq.), and CEQA Guidelines (California Administrative Code Section 15000 et seq.).

According to CEQA Guidelines §15132, the Final EIR shall consist of the following:

- a. The Draft EIR or a revision of the Draft;
- Comments and recommendations received on the Draft EIR, either verbatim or in summary;
- c. A list of persons, organizations, and public agencies commenting on the Draft EIR;
- d. The responses of the Lead Agency to significant environmental points raised in the review and consultation process; and
- e. Any other information added by the Lead Agency.

In accordance with these requirements, the Brawley Solar Energy Facility Project Final EIR is comprised of the following:

- Draft EIR, December 2021 (SCH No. 2021070424); and
- This Final EIR document, dated January 2023, that incorporates the information required by §15132.

Format of the Final EIR

Section 0.1 Introduction

This section describes CEQA requirements and content of this Final EIR.

Section 0.2 Responses to Comment Letters Received on the Draft EIR

This section provides copies of the comment letters received and individual responses to written comments. In accordance with Public Resources Code 21092.5, copies of the written proposed responses to public agencies will be forwarded to the agencies at least 10 days prior to certifying the EIR. The responses conform to CEQA Guideline 15088, providing "... good faith, reasoned analysis in response."

Section 0.3 Errata to the Draft EIR

This section of the Final Environmental Impact Report (EIR) identifies the location of, or contains revisions to, information included in the Draft EIR dated December 2021, based upon additional or revised information required to prepare a response to a specific comment. The information added to the EIR does not meet the requirements for recirculation pursuant to Section 15088.5 of the State *California Environmental Quality Act (CEQA) Guidelines*.

Section 0.4 Mitigation Monitoring and Reporting Program

This section includes the Mitigation Monitoring and Reporting Program (MMRP) which identifies the mitigation measures, timing, and responsibility for implementation of the measures.

0.1-2 | January 2023 County of Imperial

0.2 Response to Comments

This section contains responses to all comment letters received on the Draft EIR. Six letters were received during the comment period, which began on December 27, 2021, and closed on February 10, 2022. A copy of each letter with bracketed comment numbers on the right margin is followed by the response for each comment as indexed in the letter. The comment letters are listed in Table 0.2-1.

Table 0.2-1. Brawley Solar Energy Facility Project Draft EIR Comment Letters

Letter	Commenter	Date
Α	Imperial Irrigation District	January 6, 2022
В	California Department of Transportation	February 9, 2022
С	City of Brawley	February 10, 2022
D	Law Offices of Stephan C. Volker	February 10, 2022
Е	Donna (Cox) Tisdale, Michael Cox, Carolyn (Cox) Allen, Lawrence Cox; C/O Donbee Farms & on behalf of Backcountry Against Dumps	February 10, 2022
F	Adams Broadwell Joseph & Cardozo, on behalf of Citizens for Responsible Industry	February 10, 2022



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A.1

A.2

January 6, 2022

Mr. David Black Planner IV Planning & Development Services Department County of Imperial 801 Main Street El Centro, CA 92243

RECEIVED

JAN 06 2021

Har charty Journey PLANNING & DEVELOPMENT SEPTETCES

SUBJECT: NOA of a DEIR for the Brawley Solar Energy Facility Project

Dear Mr. Black:

On December 27, 2021, the Imperial County Planning & Development Services Department issued a Notice of Availability of a Draft Environmental Impact Report for the Brawley Solar Energy Facility Project. The applicant, ORNI 30, LLC, is proposing to construct and operate a 40 MW PV solar facility with an integrated 40 MW battery energy storage system, on approximately 227 acres of privately-owned land located about one mile north from the City of Brawley's jurisdictional limit in the unincorporated area of Imperial County, CA (APNs 037-140-006, -020, -021, -022, and -023), south of Baughman Road, west of Best Road, and north of Andre Road. The Union Pacific Railway transects the project site and the City of Brawley Wastewater Treatment Plant is located along the western edge of the project site. The project would be comprised of bifacial solar PV arrays panels, an on-site substation, BESS, fiber optic line or microwave tower, inverters, transformers, underground electrical cables and access roads. The project would connect to the existing North Brawley Geothermal Power Plant substation located southwest of the project site via an approximately 1.8-mile long aboveground 92 kV generation tie line.

The Imperial Irrigation District has reviewed the DEIR and in addition to the comments provided in the August 30, 2021 district letter on the Notice of Preparation fo the DEIR (see attached letter), the applicant should be advised that the proposed 92 kV gen-tie line to connect the project to the existing North Brawley Geothermal Power Plant substation will be impacting IID's B-721 and B-711 distribution circuits and the CO transmission line. Consequently, the applicant should submit an Encroachment Permit application to IID as soon as possible. The application process will enable the district to review project impacts to IID energy and water facilities. Any impacts to IID facilities that need to be mitigated will be at the expense of the

Should you have any questions, please do not hesitate to contact me at 760-482-3609 or at dvargas@iid.com. Thank you for the opportunity to comment on this matter.

Respectfully

Donald Vargas

Compliance Administrator II

Enrique B. Martinez – General Manager
Mike Pacheco – Manager, Water Dept.
Marilyn Del Bosque Gilbert – Manager, Energy Dept.
Constance Bergmark – Mgr. of Planning & Eng./Chief Elect. Engineer, Energy Dept.
Wayne K. Strumpfer, General Counsel
Jamie Asbury – Assoc. General Counsel
Michael P. Kemp – Superintendent, Regulatory & Environmental Compliance
Laura Cervantes – Supervisor, Real Estate
Lesse A Human – Environmental Project Mar. Sc. Water Deat

Jessica Humes - Environmental Project Mgr. Sr., Water Dept.

IMPERIAL IRRIGATION DISTRICT . P.O. BOX 937 . IMPERIAL, CA 92251

0.2-4 | January 2023 County of Imperial



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August 30, 2021

Mr. David Black Planner IV Planning & Development Services Department County of Imperial 801 Main Street El Centro, CA 92243

SUBJECT: NOP of a DEIR for the Brawley Solar Energy Facility Project

Dear Mr. Black:

On July, 2021, the Imperial Irrigation District received from the Imperial County Planning & Development Services Department, a Notice of Preparation of a Draft Environmental Impact Report for the Brawley Solar Energy Facility Project. The applicant, ORNI 30, LLC, is proposing to construct and operate a 40 MW PV solar facility with an integrated 40 MW battery energy storage system, on approximately 227 acres of privately-owned land located about one mile north from the City of Brawley's jurisdictional limit in the unincorporated area of Imperial County, CA (APNs 037-140-006, -020, -021, -022, and -023), south of Baughman Road, west of Best Road, and north of Andre Road. The Union Pacific Railway transects the project site and the City of Brawley Wastewater Treatment Plant is located along the western edge of the project site. The project would be comprised of bifacial solar PV arrays panels, an on-site substation, BESS, fiber optic line or microwave tower, inverters, transformers, underground electrical cables and access roads. The project would connect to the existing North Brawley Geothermal Power Plant substation located southwest of the project site via an approximately 1.8-mile long aboveground 92 kV generation tie line.

The Imperial Irrigation District has reviewed the information and has the following comments:

1. If the project requires temporary construction or permanent electrical service at the distribution level, the applicant should be advised to contact Gabriel Ramirez, IID Customer Project Development Planner, at (760) 482-3300, (760) 482-9257 or e-mail Mr. Ramlrez at gramirez@iid.com. to initiate the customer service application process. In addition to submitting a formal application (available for download at the district website http://www.iid.com/home/showdocument?id=12923), the applicant will be required submit a complete set of plans approved by the County of Imperial (in hardcopy and AutoCad formats) including site plan, plan & profile drawings, one-line diagrams, and electrical loads, panel size, voltage requirements, project schedule, estimated in-service date and and the project's Conditional Use Permit, in addition to the applicable fees, permits, easements and environmental compliance documentation pertaining to the provision of electrical service to the project. The applicant shall be responsible for all costs and mitigation measures related to providing electrical service to the project.

A.4

IMPERIAL IRRIGATION DISTRICT + P.O. BOX 937 + IMPERIAL, CA 92251

David Black August 30, 2021 Page 2

- Distribution-rated electrical service is limited in the area. A circuit study may be required. Any improvements or mitigation identified in the circuit study to enable the provision of electrical service shall be the financial responsibility of the applicant.
- IID water facilities that may be impacted include Best Canal, Best Lateral 1, Livesley Drain, and Best Drain. The applicant may not use IID's canal or drain banks to access the project site. Any abandonment of easements or facilities shall be approved by IID based on systems (Irrigation, Drainage, Power, etc.) needs.
- 4. To insure there are no impacts to IID facilities, applicant should submit project plans, including grading & drainage and fencing plans, to IID Water Department Engineering Services for review and comment prior to final project design and CUP approval. IID WDES can be contacted at (760) 339-9265 for further information on this matter.
- The project may impact IID drains with project site runoff flows draining into IID drains. To
 mitigate impacts, the project may require a comprehensive IID hydraulic drainage system
 analysis. IID's hydraulic drainage system analysis includes an associated drain impact
 fee.
- 6. A construction storm water permit from the California Regional Water Quality Control Board is required before commencing construction and an industrial storm water permit from CRWQCB is required for the operation of the proposed facility. The project's Storm Water Pollution Prevention Plan and storm water permits from CRWQCB should be submitted to IID for review.
- For information on procuring construction water, the applicant should contact IID North End Division at (760) 482-9900.
- 8. The impacts to the Salton Sea, due to loss or reduction of agricultural runoff caused by agricultural land conversion to urban use shall require discussion in the EIR. Due to the potential loss or reduction of inflow to the Salton Sea and to IID drains with its concurrent environmental impacts, the applicant should address this issue as well as provide analysis that the project does not negatively impact the IID Water Conservation and Transfer Draft Habitat Conservation Plan, the existing Section 7 Biological Opinion and the California Endangered Species Act Permit 2081.
- 9. An assessment or discussion of cumulative impacts considering other non-agricultural facilities whose water use (or potential water use) would reduce the inflow conveyed to IID drains and the Salton Sea is necessary. It is advisable that the applicant present a cumulative impact analysis on inflow to IID drains and the Salton Sea.

The documents mentioned previously are available at:

 The HCP is part of the IID Water Conservation and Transfer Project, Final EIR/EIS and can be found at <u>Water/Library/QSA-Water-Transfer/Environmenta-Assessment/Permits/Final EIREIS</u>; Volume II, Appendix A Species Covered by the HCP. The HCP in the Draft EIR/EIS may contain small changes from the final version of the EIR/EIS. It is in a different appendix in the draft that the final A.4 cont'd

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David Black August 30, 2021 Page 3

EIR/EIS (Appendix C). Until the final HCP/Natural Community Conservation Plan is approved, IID uses the draft HCP in the draft document, which can be accessed at Water/Library/QSA-Water-Transfer/Environmental-Assessment).

- The Biological Opinion (federal ESA permit) is at https://www.iid.com/Imperial-Irrigation-District/Salton-Sea-Areas.
- The CESA 2081 (the water transfer operates under this state ESA permit until the NCCP is approved) can be found at https://www.iid.com/water/library/qsa-water-transfer/environmental-assessments-permits/cesa-compliance.
- The MMRP (Mitigation Monitoring and Report Program) is at https://www.iid.com/Water/Library/QSA-Water-Transfer/Mitigation.
- 10. In order to obtain a water supply from IID for a non-agricultural project, the project proponent will be required to comply with all applicable IID policies and regulations and may be required to enter into a water supply agreement. Such policies and regulations require, among other things, that all potential environmental and water supply impacts of the project be adequately assessed, appropriate mitigation developed if warranted, including any necessary approval conditions adopted by the relevant land use and permitting agencies.

A.4 cont'd

- 11. If IID implements a water allocation or apportionment program pursuant to the IID Equitable Distribution Plan, or any amending or superseding policy for the same or similar purposes, during all or any part of the term of said water supply agreement, IID shall have the right to apportion the project's water as an industrial water user. Information on how to obtain a water supply agreement can be found at the IID website https://www.iid.com/water/municipal-industrial-and-commercial-customers or by contacting Justina Gamboa-Arce, Water Resources Planner at (760) 339-9085 or igamboaarce@iid.com.
- 12. Any construction or operation on IID property or within its existing and proposed right of way or easements including but not limited to: surface improvements such as proposed new streets, driveways, parking lots, landscape; and all water, sewer, storm water, or any other above ground or underground utilities; will require an encroachment permit, or encroachment agreement (depending on the circumstances). A copy of the IID encroachment permit application and instructions for its completion are available at https://www.lid.com/about-iid/department-directory/real-estate. The IID Real Estate Section should be contacted at (760) 339-9239 for additional information regarding encroachment permits or agreements.
- 13. In addition to IID's recorded easements, IID claims, at a minimum, a prescriptive right of way to the toe of slope of all existing canals and drains. Where space is limited and depending upon the specifics of adjacent modifications, the IID may claim additional secondary easements/prescriptive rights of ways to ensure operation and maintenance of IID's facilities can be maintained and are not impacted and if Impacted mitigated. Thus, IID should be consulted prior to the installation of any facilities adjacent to IID's facilities.

David Black August 30, 2021 Page 4

Certain conditions may be placed on adjacent facilities to mitigate or avoid impacts to IID's facilities

- 14. An IID encroachment permit is required to utilize existing surface-water drainpipe connections to drains and receive drainage service from the district. Surface-water drainpipe connections are to be modified in accordance with IID Water Department Standards.
- 15. Any new, relocated, modified or reconstructed IID facilities required for and by the project (which can include but is not limited to electrical utility substations, electrical transmission and distribution lines, water deliveries, canals, drains, etc.) need to be included as part of the project's CEQA and/or NEPA documentation, environmental impact analysis and mitigation. Failure to do so will result in postponement of any construction and/or modification of IID facilities until such time as the environmental documentation is amended and environmental impacts are fully analyzed. Any and all mitigation necessary as a result of the construction, relocation and/or upgrade of IID facilities is the responsibility of the project proponent.

Should you have any questions, please do not hesitate to contact me at 760-482-3609 or at dvargas@iid.com. Thank you for the opportunity to comment on this matter.

Respectfully,

Donald Vargas

Compliance Administrator II

Enrique B. Martinez – General Manager
Mike Pachaco – Manager, Water Dept.
Marliyn Del Bosque Gilbert – Manager, Energy Dept.
Constance Bergmark – Mgr. of Planning & Eng./Chief Elect. Engineer, Energy Dept.
Enrique De Leon – Asat. Mgr., Energy Dept., Distr., Planning, Eng. & Customer Servi
Jamile Asbury – Assoc. General Counsel
Vance Taylor – Asst. General Counsel
Michael P. Kemp – Superfiniendent, Regulatory & Environmental Compliance
Laura Cervantes – Supervisor, Real Estate
Jessica Humes – Environmental Project Mgr. Sr., Water Dept.

A.4 cont'd

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Letter A Imperial Irrigation District January 6, 2022

- **A.1** This comment is an introductory comment and does not raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required, and the comment is noted for the record.
- A.2 This comment states that the project's proposed 92 kV gen-tie line, which would connect to the existing North Brawley Geothermal Power Plant substation will impact IID's B-721 and B-711 distribution circuits and the CO transmission line; therefore, an IID encroachment permit is required. The applicant will coordinate with IID with respect to any potential encroachment into IID rights of way and any potential impacts to IID's energy and water facilities, including applying for an encroachment permit as necessary. Coordination with IID regarding these matters will be included as one of the Conditional Use Permit's (CUP) Conditions of Approval for the project. This comment does not otherwise raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required, and the comment is noted for the record.
- **A.3** The contact information for IID is received and acknowledged.
- A.4 This comment provides a courtesy copy of IID's comments on the Notice of Preparation of the Draft EIR. These comments were considered by the County in preparing the Draft EIR as part of the scope of the Draft EIR's analysis. This comment does not raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required, and the comment is noted for the record.

CALIFORNIA STATE TRANSPORTATION AGENCY

GAVIN NEWSOM, GOVERNOR

California Department of Transportation

DISTRICT 11 4050 TAYLOR STREET, MS-240 SAN DIEGO, CA 92110 (619) 709-5152 | FAX (619) 688-4299 TTY 711 www.dot.ca.gov

February 9, 2022





11-IMP-SR-1111 PM 24.9 Brawley Solar Energy DEIR SCH 2021070424/GPA# 21-0003

David Black Imperial County Planning & Development Services 801 Main Street El Centro, CA 92243

Dear Mr. Black:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the Brawley Solar Energy project Draft Environmental Impact Report (DEIR) located near State Route 111 (SR-111). The mission of Caltrans is to provide a safe and reliable transportation network that serves all people and respects the environment. The Local Development Review (LDR) Program reviews land use projects and plans to ensure consistency with our mission and state planning priorities.

Safety is one of Caltrans' strategic goals. Caltrans strives to make the year 2050 the first year without a single death or serious injury on California's roads. We are striving for more equitable outcomes for the transportation network's diverse users. To achieve these ambitious goals, we will pursue meaningful collaboration with our partners. We encourage the implementation of new technologies, innovations, and best practices that will enhance the safety on the transportation network. These pursuits are both ambitious and urgent, and their accomplishment involves a focused departure from the status quo as we continue to institutionalize safety in all our work.

Caltrans has the following comments:

Design & Utilities Engineering

Please be advised that Caltrans has a safety construction project near Andre Road and SR-111, scheduled to start construction in October of 2023. Early coordination with Caltrans will be required.

 This safety project will also include rumble strip work at SR-111 and Andre Road.

"Provide a safe and reliable transportation network that serves all people and respects the environment"

B.1

B.2

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Mr. David Black February 9, 2022 Page 2

After the Brawley Solar project is completed, please coordinate with Caltrans Right of Way (R/W) Engineering to update as built-plans to reflect any possible changes at SR-111 and Andre Road.

B.2 cont'd

Prior to the contractor's operation, Underground Dig Alert requirements must comply with Caltrans' standard specifications.

B.3

B.4

According to the DEIR document, the project includes a gen-tie line with 66-foot-high poles to interconnect to the Imperial Irrigation District (IID') existing North Brawley Geothermal Power Plant substation.

- According to the Highway Design Manual any poles located near state highways should be located outside the clear recovery zone.
- This would need to be reviewed by and concurred with Caltrans' Traffic Operations Branch.
- Supporting Poles (or guy wires) should not be placed in State R/W.
- If the overhead lines cross or span across the highway, vertical clearance will need to be met and follow California Public Utilities Commission (CPUC) guidelines.

Per Caltrans design standards, if the fiber optic conduit is installed underground, the work on SR-111 would need to have proper traffic control and the roadway pavement structural section would need to be replaced where trenching occurs.

B.5

- This work must comply with tunneling Cal-OSHA Specs.
- Caltrans' Oversight Inspection must be present when working under SR-111, during the boring for the conduit.

Right-of-Way

Any work performed within Caltrans' R/W will require discretionary review and approval by Caltrans and an encroachment permit will be required for any work within the Caltrans' R/W prior to construction. As part of the encroachment permit process, the applicant must provide an approved final environmental document, corresponding technical studies, and necessary regulatory and resource agency permits, specifically, any CEQA determinations or exemptions.

B.6

Please follow Caltrans Highway Design Manual (HDM) guidelines and standards for final design and plan submittal when applying for an encroachment permit with Caltrans.

Please see the following chapters in the Caltrans' manuals:

 Chapter 600 of the Encroachment Permits Manual for requirements regarding utilities and state R/W: https://dot.ca.gov/-/media/dot-

[&]quot;Provide a safe and reliable transportation network that serves all people and respects the environment"

Mr. David Black February 9, 2022 Page 3

<u>media/programs/traffic-operations/documents/encroachment-permits/chapter-6-ada-ally.pdf.</u>

- Chapter 2-2.13 of the Plans Preparation Manual for requirements regarding utilities and state R/W: https://dot.ca.gov/-/media/dot-media/programs/design/documents/cadd/ppm-text-ch2-sect2-13-a1ly.pdf
- Chapter 17 of the Project Development Procedures Manual https://dot.ca.gov/-/media/dot-media/programs/design/documents/pdpm-chapter17-a11y.pdf.

Per Business and Profession Code 8771, perpetuation of survey monuments by a licensed land surveyor is required, if they are being destroyed by any construction.

Additional information regarding encroachment permits may be obtained by contacting the Caltrans Permits Office at (619) 688-3276 or emailing D11.Permits@dot.ca.gov or by visiting the website at https://dot.ca.gov/programs/traffic-operations/ep.

Early coordination with Caltrans is strongly advised for all encroachment permits.

If you have any questions, please contact Roger Sanchez at (619) 987-1043 or by email at roger.sanchez-rangel@dot.ca.gov.

Sincerely,

Maurice A. Eaton

MAURICE EATON Branch Chief Local Development Review B.6 cont'd

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[&]quot;Provide a safe and reliable transportation network that serves all people and respects the environment"

Letter B California Department of Transportation February 9, 2022

- **B.1** This is an introductory comment that provides a general summary of the project and states the mission of the California Department of Transportation (Caltrans). This comment does not raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required, and the comment is noted for the record.
- B.2 The County acknowledges that Caltrans will start construction of a safety project near Andre Road and SR-111 in October 2023. As a condition of project approval, the applicant will be required to coordinate with Caltrans with respect to construction schedules. No work within Caltrans right of way is proposed associated with the proposed project. However, the County does acknowledge any possible changes at SR-111 and Andre Road will require coordination on the behalf of the Applicant with Caltrans Right of Way Engineering.
- **B.3** Comment acknowledged. As a condition of approval of the project, the Applicant will be required to comply with Underground Dig Alert requirements in accordance with Caltrans' standard specifications.
- **B.4** The County acknowledges Caltrans' requirements related to the construction of the off-site gen-tie line as summarized in this comment. As a condition of approval of the project, the Applicant will be required to coordinate with Caltrans with regards to the design and location of the gen-tie line and poles near state highways.
- **B.5** No work within Caltrans right of way is proposed associated with the proposed project. However, the County does acknowledge that any underground work proposed by the Applicant within Caltrans right of way will need to comply with the requirements summarized in this comment.
- **B.6** No work within Caltrans right of way is proposed associated with the proposed project. However, the County does acknowledge that any work performed by the Applicant within Caltrans right of way requires approval of an encroachment permit.
- **B.7** The contact information for Caltrans is received and acknowledged.



PUBLIC WORK / CITY ENGINEER 180 S. WESTERN AVENUE BRAWLEY, CALIFORNIA 92227 PHONE: (760) 344-5800 FAX: (760) 344-5612

February 10, 2022

David Black, Planner IV Imperial County Planning & Development Services Department 801 Main Street El Centro, CA 92243

Re: Draft Environmental Impact Report for the Brawley Solar Energy Facility Project (State Clearinghouse [SCH] # 2021070424) – City of Brawley Public Works Department Comments

Dear Mr. Black:

I write to provide comments on the above-mentioned Draft Environmental Impact Report (DEIR) as it may impact the City of Brawley Wastewater Treatment Plant (WWTP), which is located at 5015 Best Road, Brawley, CA 92227. The WWTP is located approximately within the area outlined in blue in Figure 1 below, and is located directly west of the proposed Brawley Solar Energy Facility Project.



Figure 1: Approximate Location of the City of Brawley WWTP

*WWTP road access

WWTP grounds

☆ WWTP entrance gate

C.1

0.2-14 | January 2023 County of Imperial

David Black, Planner IV February 10, 2022 Page 2

Our comments focus on three areas of interest to the City:

- Continued use by the City of the unimproved road that provides access to the WWTP;
- Potential air quality impacts on City staff who work at the WWTP; and
- Potential impacts to the WWTP.

Each of these three issues are discussed further below.

Continued Access to the WWTP

Access to a portion of the WWTP is secured through an easement that was approved in 2007 concurrent with the construction of the facility. The easement applies to that portion of the access road that runs in an easterly/westerly direction from Best Road. The City relies upon the unimproved road continuing from the easement to the south/southwest to provide staff access to the WWTP, allow for vacuum trucks to transport wastewater to the facility and to transport solids generated by the WWTP to licensed Class 1 landfills, and provide access for heavy vehicles/equipment for materials delivery, maintenance, repair, and system upgrade purposes. Note that this access road provides the only reliable access to the plant for heavy (25-ton category) vehicles. Simply put: the unimproved road is essential to support WWTP operations.

The DEIR indicates that the project construction phase would include "the renovation of existing dirt roads to all-weather surfaces (to meet County standards) from N Best Avenue to the City of Brawley wastewater treatment plant" (see DEIR, Impact 3.13-3, page 3.13-6). The Traffic Study (Appendix G) is notably silent on the location and existing level of service of the WWTP access road or the scope of this proposed renovation. Moreover, the design of the haul roads within the facility and the scope and extent of the "renovation" of the existing unimproved road that the WWTP relies on for current operation is not specified in the DEIR. Rather, this information will become available only with the development of a "Haul Route Study," which will only be submitted at the time of final design for the proposed project, and subject to review by the Imperial County Department of Public Works as a Condition of Approval of the proposed project. Finally, the plot plan for the proposed solar facility (Figure 3-2, page 2-5) suggests that solar panels will be placed within the right-of-way of the access road. We therefore request that the DEIR be expanded to address the following impacts to the WWTP:

- 1) The DEIR should be expanded to provide decisionmakers with sufficient information to establish the current use of the existing dirt road that provides access to the WWTP. Figure 1 includes a graphic description of this existing access corridor, the entire length of which should be considered and included in this analysis.
- 2) The DEIR should be expanded to provide decisionmakers information to assure that proposed "renovations" will be adequate to support current and future vehicle use by the WWTP. Specifically, that the heavy vacuum trucks, equipment, and haul trucks (i.e., 25-ton category vehicles) can continue to rely on the access road to access and transit safely all portions of the WWTP.
- 3) The DEIR should be expanded to provide decisionmakers with an understanding of how vehicle traffic may continue to access the WWTP during construction all proposed "renovations."
- 4) Finally, the DEIR should specifically consider whether the fencing proposed for the perimeter of the Brawley solar energy project may impact vehicle traffic to and from the WWTP in any way.

C.2

C.3

C.4

C.5

C.6

C.7

C.8

David Black, Planner IV February 10, 2022 Page 3

Quantify Air Quality Impacts

The DEIR does not quantify the potential air toxic impacts of diesel exhaust for staff at the WWTP; the document considers only residential exposures located to the east of the proposed facility (see Impact 3.4-3, page 3.4-21). We wish to confirm that the backup/standby diesel engine will be rated no more 20 kW (60 HP) and will comply with EPA Tier IV emission standards. The DEIR should also indicate where the backup generator will be located relative to the WWTP.

C.9

Analysis of Impacts to the WWTP

The DEIR largely ignores the potential impacts to the WWTP. The traffic analysis does not consider impacts to the access road nor address potential safety issues posed at the unguarded railroad crossing to traffic entering and exiting the WWTP, with respect to the location of solar panels that may obstruct the view of trains at the crossing. The Air Quality Impact Analysis does not consider air toxic impacts to WWTP staff. Finally, the DEIR relies on forthcoming mitigation measures and plans to assure that project impacts are below CEQA significance levels, with no discussion of whether these plans are to consider the WWTP.

C.10

We therefore request that the City of Brawley be copied on all forthcoming plans and mitigation measures required under approvals granted for the Brawley Solar Energy Facility Project (e.g., Haul Route Study, Roadway Maintenance Agreement, Project Drainage Plan, and other plans related to soil erosion and stormwater management). In addition, we request that the these plans and mitigation measures be conditioned to ensure that implementation of these measures will not affect either the access road or the WWTP. We also request that the DEIR specifically address potential safety issues posed locating solar panels proximate to the railroad crossing; specifically, whether panels may obscure the visibility to train traffic at the crossing over the access road. Should there be a potential for such impact(s), the DEIR should be revised to provide decisionmakers with an understanding of the baseline conditions and potential project impacts.

C.11

Thank you for this opportunity to provide comment on this important project that will provide renewable energy to our state and help achieve the ambitious greenhouse gas reductions called for by A ssembly Bill 32 and our Governor. Please contact Public Works Director Guillermo Sillas at (760) 344 – 5800 should you wish to discuss these comments directly.

C.12

Sincerely,

Tyler Salcido

City Manager City of Brawley

383 Main Street

Brawley, CA 92227

760.351.3048 City Manager Office

TSalcido@brawley-ca.gov

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Letter C
City of Brawley
February 10, 2022

- C.1 This is an introductory comment illustrates the location of the City of Brawley's Wastewater Treatment plant, access road, and north and south entrances relative to the project site. This comment does not raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required, and the comment is noted for the record.
- C.2 This comment identifies the three areas of concern to the City of Brawley as it relates to the proposed project. Responses to these areas of concern are provided in responses to comments C.4 through C.11.
- C.3 The County acknowledges that access to the City's Wastewater Treatment Plant is facilitated through an easement that was granted in 2007, which allows the City vehicular access to the treatment plant through APN's #037-140-023 and 037-140-022. This comment provides a description of various vehicles that rely on this unimproved access road including staff access, vacuum trucks, and a variety of heavy vehicle/equipment.
 - The County acknowledges that the access road is essential to the operations of the City's treatment plant, and the proposed project will be constructed so as to not interfere with this existing access. It is the intent of the County and project applicant to work cooperatively with the City so as to not interfere with the normal operations of the City's WTTP.
- C.4 The County and project applicant met with the City of Brawley on February 1, 2022 and February 8, 2022 to discuss the City's concerns. The County and project applicant acknowledge that the access road is essential to the operations of the City's treatment plant. As a result of the meetings, the project applicant would not make any improvements to the existing WTTP access road. The project applicant would only renovate the existing dirt roads within the project site to all-weather surfaces to meet the County standards. If agreeable by the City of Brawley, the roadway from N Best Avenue to the City of Brawley WWTP could be renovated to all-weather surfaces. For clarification, page 2-14 of the Final EIR has been revised as follows:

"Project construction would include the renovation of existing dirt roads to all-weather surfaces (to meet the County standards) from N Best Avenue to the City of Brawley wastewater treatment plant. Construction of the proposed project would begin with clearing of existing brush and installation of fencing around the project boundary. Fencing would consist of a six-foot chain-link fence topped with barbed wire. A 20-foot road of engineering-approved aggregate would surround the site within the fencing.

Project construction would include the renovation of existing dirt roads within the project site, to all-weather surfaces (to meet the County standards). If agreeable by the City of Brawley, the roadways outside the project site would also be renovated to all-weather surfaces to improve the roadway from N Best Avenue to the City of Brawley WWTP. These improvements would be coordinated with the City of Brawley."

The project would not place any project components within the WTTP's right-of-way of the access road. Figure 2-3 of the Final EIR has been revised to show that all project components, including solar panels and fencing, will all be located within the project boundary (i.e., within

- the property lines). Figure 2-4, Proposed Access and Fencing Plan, has been added to the Final EIR to clarify proposed access improvements, fencing, and to show that all project components will be within the property lines.
- **C.5** Figure 2-4, Proposed Access and Fencing Plan, has been added to the Final EIR to clarify proposed access improvements and fencing plan. Please refer to response to comment C.4.
- **C.6** Please refer to responses to comments C.4 and C.5.
- C.7 As stated on Draft EIR page 3.13-6, a Haul Route Study which would include a Roadway Maintenance Agreement will be required prior to commencement of construction as a Condition of Approval. Additionally, a traffic construction management plan, subject to approval by the County Department of Public Works, would be required as a Conditional of Approval of the CUP. The construction management plan would need to provide for the accommodation of existing traffic accessing the treatment plant so that existing access is not precluded or otherwise impeded treatment plant operations.
- C.8 As described in response to comment C.4, the project would not place any project components within the WTTP's right-of-way of the access road. Figure 2-4 has been added to the Final EIR which depicts proposed access and fencing locations and illustrates that existing access to the treatment plant will be maintained as part of the project.
- C.9 The proposed backup generator would be located within the southern portion of the project site, within the area identified as "Battery Energy Storage System." Specifically, the location of the backup generator is described on pages 2-7 through 2-8 of the Draft EIR. As described in the Draft EIR, "a 20kV emergency backup generator would be located adjacent to the [substation]control room for the HVAC system." As shown on Figure 2-3 of the Draft EIR, the proposed substation would be located at the southern edge of the project site, at a distance of approximately 1,320 feet (1/4 mile), downwind of prevailing winds of the WTTP. The proposed project will use a 20kV emergency backup generator and will comply with EPA Tier IV emissions standards.

By definition, sensitive receptors include, but are not limited to, hospitals, schools, daycare facilities, elderly housing and convalescent facilities. These are areas where the occupants are more susceptible to the adverse effects of exposure to toxic chemicals, pesticides, and other pollutants.

The City of Brawley Wastewater Treatment Plant (WTTP) is not considered a sensitive receptor. As such, the quantification of the potential air toxic impacts of diesel exhaust for the WTTP is not required. However, no significant health risk impact was identified related to sensitive receptors which are located in closer proximity and downwind of the proposed generator as compared to the WTTP. Because the WTTP is not permanently occupied (unlike a residence), and is located 1,320 feet upwind of prevailing winds, and only irregular, periodic use of the generator would occur, no significant health risk associated with the proposed diesel backup generator would be anticipated at the WTTP.

C.10 Please refer to response to comment C.9 regarding potential air quality impacts to the WTTP.

As shown in Final EIR Figure 2-4 Proposed Access and Fencing Plan (Final EIR page 2-9), based on the proposed conceptual layout of solar panels, panels would be setback a minimum of 50-feet from the intersection where the proposed access road would cross over the existing railroad tracks in order to maintain adequate site distance.

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- C.11 The County will coordinate and copy the City of Brawley on all forthcoming plans and mitigation measures required under approvals granted for the proposed project including the Haul Route Study, Roadway Maintenance Agreement, Project Drainage Plan, and plans related to soil erosion and stormwater management. It is the intent of the County and project applicant to work cooperatively with the City so as to not interfere with the normal operations of the City's WTTP.
- **C.12** The contact information for the City of Brawley Public Works Director is received and acknowledged.

Stephan C. Volker Alexis E. Krieg (Of Counsel) Stephanie L. Clarke Jamey M.B. Volker (Of Counsel)

Law Offices of **Stephan C. Volker** 1633 University Avenue

Berkeley, California 94703

Tel: (510) 496-0600 Fax: (510) 845-1255

svolker@volkerlaw.com

February 10, 2022

VIA EMAIL

davidblack@co.imperial.ca.us

David Black Planner IV Imperial County Planning and Development Services 801 Main Street El Centro, CA 92243

Re: Comments of Backcountry Against Dumps, Donna Tisdale and Carolyn Allen on the Brawley Solar Energy Facility Project DEIR (SCH# 2021070424)

Dear Mr. Black:

On behalf of Backcountry Against Dumps, Donna Tisdale and Carolyn Allen (collectively, "Backcountry"), and pursuant to the California Environmental Quality Act ("CEQA"), Public Resources Code ("PRC") section 21000 et seq., we respectfully submit the following comments on the Brawley Solar Energy Facility Project ("Brawley Solar" or the "Project") and the draft environmental impact report ("DEIR") prepared thereon. Please include these comments in the public record for Imperial County's (the "County's") consideration and decision on Orni 30 LLC's permitting applications for the Project.

The Project would industrialize approximately 227 acres of farmland – almost all of which is prime farmland (4.4 acres) or farmland of statewide importance (205 acres) (DEIR at 3.3-1) – with a 40-megawatt ("MW") solar photovoltaic ("PV") electrical generation facility, a 40-MW battery storage system, an on-site substation, 1.8-miles of 66-foot-tall electrical gen-tie lines, transformers, inverters, new roads, fencing, a fiberoptic line or microwave tower and other infrastructure. Backcountry opposes this Project as an unnecessary industrialization of the County's irreplaceable farmland. The County has already allowed thousands of acres of farmland to be converted to electrical generation, storage and transmission uses. The County has already approved over 22,000 acres of solar farm projects to date, according to its solar project maps. Enough is enough.

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¹ The Imperial County Solar Farm Projects – South End Projects map (updated December 2,

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Backcountry urges the County to maintain the renewable energy overlay boundaries it set in October 2015, boundaries that exclude the proposed Project site. DEIR at 2-4 (the "entire project site . . . is located outside of the RE Overlay Zone"). Backcountry encourages the County to adopt an alternative to the proposed Project (like alternative 4) that is focused on programs to develop or incentivize the development of distributed PV generation projects near energy demand centers in already-disturbed areas. The County should abide by its own policy prescriptions and not approve any further renewable energy developments outside the Renewable Energy Overlay Zone, especially not projects, like the Project here, that would destroy precious and productive farmland or "result in any [other] significant environmental impacts." Imperial County General Plan, Renewable Energy and Transmission Element, Section IV(D), p. 35. As the DEIR affirms, the "RE Overlay Zone is concentrated in areas determined to be the most suitable for the development of renewable energy facilities while minimizing the impact on other established uses." DEIR at 2-4. The Project sites were omitted from the overlay zone for a reason - they are not the "most suitable" areas for renewable energy development. The County should not now modify the zone boundaries ad hoc to accommodate private development interests.

In further expression of these major concerns and others, Backcountry submits the following comments on the proposed Project and the DEIR prepared for it.

I. THE COUNTY MAY NOT APPROVE A CONDITIONAL USE THAT IS FORBIDDEN BY THE COUNTY GENERAL PLAN.

The Project is inconsistent with the County General Plan, and thus its approval would violate the Planning and Zoning Law. "A permit action taken without compliance with the hierarchy of land use laws is *ultra vires* as to any defect implicated by the uses sought by the permit." Neighborhood Action Group v. County of Calaveras ("Neighborhood") (1984) 156 Cal. App.3d 1176, 1184. Land use permits are invalid where the approved project "conflicts with a [valid] general plan policy that is fundamental, mandatory, and clear." Endangered Habitats League, Inc. v. County of Orange ("Endangered Habitats League") (2005) 131 Cal. App. 4th 777, 782; FUTURE v. Board of Supervisors ("FUTURE") (1998) 62 Cal. App. 4th 1332, 1342 (invalidating county's project approvals because the project was "inconsisten[t] with [a] fundamental, mandatory and specific land use policy"). Here, the Project is inconsistent with fundamental, mandatory and specific land use policies protecting agricultural land from incompatible development, and limiting the siting of renewable energy projects. Because the proposed solar energy generation, storage and transmission uses are specifically forbidden under

2021) is attached hereto as Exhibit 1 and also available here:

https://www.icpds.com/assets/planning/energy-maps/Solar-Power-Southend-12-2-2021.pdf. The Imperial County Solar Projects - North End Projects map (updated January 6, 2022) is attached hereto as Exhibit 2 and also available here: https://www.icpds.com/assets/planning/energymaps/Solar-Power-Northend-01-06-2022.pdf.

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the Imperial County General Plan, the County lacks authority to approve those uses in contravention of the General Plan. *Id.*

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A. The Imperial County General Plan Forbids the Proposed Solar Energy Generation, Storage and Transmission Uses on Designated Agricultural Land.

The Imperial County General Plan's Land Use Element specifically *forbids* the proposed solar uses within the "Agriculture" plan designation that applies to the entire Project site. DEIR at 1-1 ("Agriculture" is the "underlying General Plan land use"). The Land Use Element directs that lands designated as "Agriculture" may not be developed with uses that do not preserve and protect agricultural production and related activities.

The Land Use Element mandates that

[w]here [the Agriculture] designation is applied, agriculture shall be promoted as the principal and dominant use to which all other uses shall be subordinate. Where questions of land use compatibility arise, the burden of proof shall be on the non-agricultural use to clearly demonstrate that an existing or proposed use does not conflict with agricultural operations and will not result in the premature elimination of such agricultural operations. No use should be permitted that would have a significant adverse effect on agricultural production, including food and fiber production, horticulture, floraculture, or animal husbandry. . . .

Imperial County General Plan, Land Use Element (Revised 2015), page 48 (emphasis added).

Here, the non-agricultural use has *not* met its "burden" to "clearly demonstrate" that it would "not conflict with agricultural operations and will not result in the premature elimination of such agricultural operations." Id. It is undisputed that the proposed industrial-scale solar facility uses would eliminate and prevent (for at least 30 years) all agricultural use on over 200 acres of prime farmland and farmland of statewide importance. DEIR at 3.3-9. As the DEIR acknowledges, even a temporary conversion of farmland to non-agricultural use is "considered a significant impact." Id. It thus matters not whether the Project site would be converted back to agricultural uses at the end of the Project life, pursuant to mitigation measure AG-1b. DEIR at 3.3-11. And in any event, the site restoration plan is more wishful thinking than guaranteed return to farmland - the County cannot force the Project site landowners to farm the land again even if they discontinue industrial land uses on the site and restore the land to farming quality. Furthermore, the DEIR acknowledges that non-agricultural uses on the site might never even be discontinued to begin with: "At the end of the [power purchase agreement ('PPA')] term, the owner of the facility may choose to enter a subsequent PPA, update technology and recommission, or decommission and remove the generating facility and its components. Upon decommissioning, the site could be converted to other uses in accordance with applicable land use regulations in effect at that time." DEIR at 2-13.

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Moreover, the Project could impede agricultural operations elsewhere in the County and reduce employment, income, sales and tax revenue. As former Imperial County Agricultural Commissioner Valenzuela noted in her February 25, 2011 comments on the DEIR for a similar solar project, "removal of any farmland out of production would have a *direct negative impact on employment, income, sales and tax revenue.*" Exhibit 3. As these projects convert more and more agricultural land to non-agricultural uses, more and more agriculture-serving businesses will be forced to close. And as the quantity and quality of agriculture-serving businesses decreases in the County, more and more farmers will find it uneconomical or impractical to keep farming and sell, lease or use their lands for non-agriculture purposes. Evidencing this phenomenon is the conversion or planned conversion thus far of thousands of acres of prime farmland and farmland of statewide importance into industrial-scale renewable energy projects. Exhibits 1; Exhibit 2; DEIR at 3.3-4.

Because the proposed solar energy generation, storage and transmission uses would eliminate the potential for farming on the Project sites and encourage farmland conversion elsewhere in the County, the Project is specifically forbidden by the General Plan.

B. The Imperial County General Plan Forbids the Proposed Solar Energy Generation, Storage and Transmission Uses outside of the Renewable Energy Overlay Zone.

The Imperial County General Plan also forbids the development and operation of renewable energy projects outside of the designated Renewable Energy Overlay Zone. The Renewable Energy and Transmission Element states that "Conditional Use Permit applications proposed for specific renewable energy projects not located in the RE Overlay Zone would not be allowed without an amendment to the RE Overlay Zone." Imperial County General Plan, Renewable Energy and Transmission Element (Revised 2015) at 34. It only allows RE Overlay Zone amendments for renewable energy projects that either (1) are adjacent to an existing RE Overlay Zone or (2) meet the requirements for an "island" overlay. *Id.* at 34-35. To qualify for an island overlay, the subject project must (1) be "located adjacent (sharing a common boundary) to an existing transmission source," (2) "[c]onsist[] of the expansion of an existing renewable energy operation," and (3) "not result in any significant environmental impacts." *Id.* at 35; Imperial County Land Use Ordinance § 91701.01 (same); DEIR at 3.11-14.

Here, the Project would require an amendment to the Renewable Energy Overlay Zone because the "entire project site is located outside the RE Overlay Zone." DEIR at 3.11-14. Because the "project site is not located adjacent to an existing RE Overlay Zone," it would "need to "meet the criteria identified for the 'Island Overlay." *Id.* But the Project cannot meet any of the three requirements for an island overlay. First, the Project site does not "shar[e] a common boundary" with an "existing transmission source." To the contrary, it would require 1.8 miles of gen tie-line to reach the existing North Brawley Geothermal Power Plant substation. DEIR at 3.11-15. Second, the Project would not "expan[d]" an "existing renewable energy operation" – it would be an entirely new operation that is not near any other solar energy generation facilities.

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DEIR at 2-1, 2-2. Third, the Project would cause significant environmental impacts, as detailed in the DEIR and discussed below. DEIR at ES-2.

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II. THE COUNTY MUST COMPLY WITH CEQA BEFORE APPROVING THE PROJECT.

A. The EIR Must Analyze the Full Range of Project Impacts.

CEQA mandates that the EIR adequately analyze the Project's environmental impacts in order to foster informed decisionmaking and to allow the public to understand the Project's impacts. Public Resources Code § 21002.1; 14 Cal. Code Regs. [CEQA Guidelines ("Guidelines")] §§ 15121, 15126. 15126.2. An EIR must include "enough detail to enable those who did not participate in its preparation to understand and to consider meaningfully the issues raised by the proposed project," particularly the potentially significant environmental impacts. Sierra Club v. County of Fresno and Friant Ranch, L.P. ("Friant Ranch") (2018) 6 Cal.5th 502, 513 (quote); CEQA Guidelines § 15126.2. The EIR "fail[s] to comply with the information disclosure provisions of CEQA" when it "omit[s] any meaningful consideration" of a potentially significant environmental impact identified in the record. Bakersfield Citizens for Local Control v. City of Bakersfield ("Bakersfield Citizens") (2004) 124 Cal.App.4th 1184, 1208. Here, the DEIR omits meaningful consideration of numerous potentially significant environmental impacts.

1. The EIR Fails to Analyze Significant Agricultural Impacts from the Project.

The DEIR acknowledges that the Project would convert the existing farmland on the Project site to non-agricultural uses. DEIR at 3.3-9, 3.3-10. But it erroneously claims that the impacts would be only temporary and would be mitigated to a less-than-significant level by payment of agricultural and other benefit fees and reclamation of the site to "land which can be farmed." DEIR at 3.3-11. As discussed, the site restoration plan is more wishful thinking than guaranteed return to farmland – the County cannot *force* the Project site landowners to farm the land again even if they discontinue industrial land uses on the site and restore the land to farming quality. And if the site is in fact re-used for the same or another industrial use after the currently proposed CUPs expire, the impacts of continued farmland conversion beyond the currently planned 30 years will likely go unstudied if they are not analyzed in the Project EIR. Even if continued or new industrial uses would be subject to additional CEQA review, that CEQA review may well use as its analytical baseline the Project's non-agricultural use, rather than the current agricultural use (especially if any new CUP application is submitted before the proposed CUP expires and before the land is "restored").

The DEIR also fails to acknowledge how the Project would significantly *indirectly* and *cumulatively* affect agriculture *countywide*, by both inducing growth of renewable energy generation, storage and transmission projects, and reducing the resources available to sustain remaining agricultural operations. As utility-scale energy projects convert more and more

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agricultural land to non-agricultural uses, more and more agriculture-serving businesses will be forced to close, due to both declining revenues and logistical problems. And as the quantity and quality of agriculture-serving businesses decrease in the County, more and more farmers will find it uneconomical or impractical to keep farming and be forced to sell, lease or use their lands for non-agriculture purposes. The EIR must analyze the "physical changes caused in turn by the economic or social changes." Guidelines § 15131 (quote); Bakersfield Citizens for Local Control v. City of Bakersfield (2004) 124 Cal.App.4th 1184, 1205 ("if the forecasted economic or social effects of a proposed project directly or indirectly will lead to adverse physical changes in the environment, then CEQA requires disclosure and analysis of these resulting physical impacts"); California Clean Energy Committee v. City of Woodland (2014) 225 Cal.App.4th 173, 188-189 (same).

One need look no further than the rapidly increasing density of wind and other renewable energy facilities in the County to see the significant impacts on the *physical environment* from these changing economic conditions and pressures. The County has already approved over 22,000 acres of solar farm projects to date, according to its solar project maps. Exhibit 1; Exhibit 2. The County cannot continue to brush aside these growth-inducing and

cumulatively massive impacts until the entire County is covered with solar panels.

2. The EIR Fails to Analyze Significant Project Impacts to Birds.

The DEIR's analysis of the Project's impacts to birds is deficient for at least three reasons. First, the DEIR entirely fails to analyze the pseudo-lake effect, which occurs when solar projects' reflective panels resemble water when viewed from above, and attract birds – especially migratory birds – searching for water. Once tricked, the birds can – and often do – dive into the solar panels as if they were water. This "pseudo-lake effect" is suspected to be a primary cause of migratory bird trauma and death at the Desert Sunlight PV facility in Riverside County. PV panel collision is also estimated to kill an estimated 125 to 2,675 birds per year at the 250-MW California Valley Solar Ranch PV facility, or 0.5 to 10.70 annual bird deaths per MW of nameplate electric capacity. Applying that same mortality rate here, this 40-MW Project would kill between 20 and 428 birds per year. Those numbers could be even higher given how close

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² Kagan, R.A, T.C. Vimer, P.W. Trail & E.O. Espinoza, "Avian Mortality at Solar Energy Facilities in Southern California: A Preliminary Analysis," Report of the National Fish and Wildlife Forensics Laboratory (attached hereto as Exhibit 4).

³ Walston Jr., L.J, K.E. Rollins, K.W. LaGory, K.P. Smith & S.A. Meyers, 2016, "A Preliminary Assessment of Avian Mortality at Utility-scale Solar Energy Facilities in the United States," *Renewable Energy* 92:405-414 (attached hereto as Exhibit 5). The 0.5-to-10.70 range of mortality rates is similar to the range found for a 96-MW PV facility in South Africa (1.51 to 8.50 bird deaths per MW of nameplate capacity). Visser, E., V. Perold, S. Ralston-Paton, A.C. Cardenal & P.G. Ryan, 2018, "Assessing the Impacts of a Utility-Scale Photovoltaic Solar Energy Facility on Birds in the Northern Cape, South Africa," *Renewable Energy* (attached hereto as Exhibit 6).

the Project site is to a major stop along the Pacific Flyway – the Salton Sea, "one of the most important places for birds in the Western United States" according to the Audubon Society.⁴

Second, the FEIR fails to analyze the bird habitat loss the Project would cause. Studies of five U.S. PV facilities and one South African facility showed that bird species diversity was universally lower at the PV project sites than in the adjacent areas. 5 Similarly, a before-and-after study of a utility-scale PV facility in south-central California demonstrated that raptor abundance was higher before construction than after construction, "suggesting avoidance of the facility." Exhibit 7 at 416 (quote); Exhibit 6 at 8 (reporting the same study results).

The EIR Fails to Fully Analyze the Project's Hazardous Fire Risks.

The DEIR fails to discuss whether the local firefighting services are equipped for the type of electrical and chemical fires the Project could cause, with electrical generation, transmission and battery storage components all on site. It is not enough to list the "project design features." DEIR at 3.9-8. The DEIR does not provide any written correspondence with the County Fire Department, let alone any assurance from the Department that the appropriate fire protection systems have been included in the Project and that the Department is trained and equipped to handle Project fires. This needs to happen *before* Project approval, not after as is currently proposed. DEIR at 3.12-5.

4. The EIR Fails to Fully Analyze the Project's Greenhouse Gas Emissions.

CEQA requires the lead agency to "use its best efforts to find out and disclose all that it reasonably can," and to demonstrate it has fully "considered the environmental consequences of [its] action." CEQA Guidelines § 15144. Yet, the DEIR fails to analyze the Project's lifecycle greenhouse gas emissions – it looks solely at the Project's construction and operational emissions, without an analysis of the greenhouse gases emitted to produce the components used to build the Project's PV panels, and the emissions from the breakdown/recycling/disposal of all project components including batteries. The DEIR also fails to support its claim that the Project "would reduce GHG emissions created in Imperial County by 4,319 MTCO2e by providing a zero carbon source of electricity generation." DEIR at 3.8-11. It provides no evidence showing what kind of electricity generation the Project would replace, if any.

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⁴ The Audubon Society's "Birds of the Salton Sea" website is available here: https://ca.audubon.org/conservation/birds-salton-sea

⁵ For the South African study, see Exhibit 6 at 7. For the study of the U.S. facilities, see Smith, J.A. & J.F. Dwyer, 2016, "Avian Interactions with Renewable Energy Infrastructure: An Update," *The Condor* 118:411-423, 416 (attached here as Exhibit 7).

⁶ See the California Department of Forestry and Fire Protection, Office of the State Fire Marshall's November 2010 manual for Fire Operations for Photovoltaic Emergencies (attached hereto as Exhibit 8).

5. The EIR Fails to Analyze the Project's Electromagnetic Field Impacts.

The DEIR fails to even mention the Project's electromagnetic field ("EMF") radiation and its potentially significant impacts on humans and wildlife. The Project would expose Project workers, agricultural workers in adjacent fields and wildlife to EMF. People and wildlife near the many inverter modules (DEIR at 2-7) for the Project's PV panel arrays would be particularly susceptible to harm. Studies have linked EMF exposure with an increase in ailments such as diabetes, fibromyalgia, chronic fatigue syndrome and attention deficit disorder, among others. See, e.g., Exhibit 9; Exhibit 10. The EIR must fully analyze the Project's EMF radiation impacts on human health and wildlife.

For each of these reasons, Backcountry opposes the Project as currently proposed, and requests that the EIR be recirculated after analyzing all of the impacts and alternatives discussed above.

Respectfully submitted,

Stephan C. Volker

Attorney for Backcountry Against Dumps, et al.

Attachment list on next page.

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¹³ The process of converting the DC electricity to AC electricity interrupts current flow and produces "dirty electricity" (contamination of the 60 Hz electricity on the electrical grid with high frequency voltage transients). *See, e.g.,* Milham, S., 2011, "Attention Deficit Hyperactivity Disorder and Dirty Electricity," *Journal of Developmental and Behavioral Pediatrics* (attached hereto as Exhibit 9); Milham, S. & L.L. Morgan, 2008, "A New Electromagnetic Exposure Metric: High Frequency Voltage Transients Associated with Increased Cancer Incidence in Teachers in a California School," *American Journal of Industrial Medicine*, p.2 (attached hereto as Exhibit 10). Dirty electricity has been recognized as a significant cause of EMF-related health risks, such as those described below.

Attachments: Exhibit 1 - Imperial County, 2021, "Imperial County Solar Farm Projects: South End Projects," available at: https://www.icpds.com/assets/planning/energymaps/Solar-Power-Southend-12-2-2021.pdf

> Exhibit 2 - Imperial County, 2022, "Imperial County Solar Farm Projects: North End Projects," available at: https://www.icpds.com/assets/planning/energymaps/Solar-Power-Northend-01-06-2022.pdf

Exhibit 3 – Connie L. Valenzuela, Imperial County Agricultural Commissioner, Letter to Armando Villa re: CUP 10-0035 8 Minutenergy Renewables, LLC, Calipatria Solar Farm II, February 25, 2011.

Exhibit 4 – Kagan, R.A., T.C. Viner, P.W. Trail & E.O. Espinoza, n.d., "Avian Mortality at Solar Energy Facilities in Southern California: A Preliminary Analysis," Report for the National Fish and Wildlife Forensics Laboratory.

Exhibit 5 - Walston Jr., L.J, K.E. Rollins, K.W. LaGory, K.P. Smith & S.A. Meyers, 2016, "A Preliminary Assessment of Avian Mortality at Utility-scale Solar Energy Facilities in the United States," Renewable Energy 92:405-414.

Exhibit 6 - Visser, E., V. Perold, S. Ralston-Paton, A.C. Cardenal & P.G. Ryan, 2018, "Assessing the Impacts of a Utility-Scale Photovoltaic Solar Energy Facility on Birds in the Northern Cape, South Africa," Renewable Energy.

Exhibit 7 - Smith, J.A. & J.F. Dwyer, 2016, "Avian Interactions with Renewable Energy Infrastructure: An Update," The Condor 118:411-423.

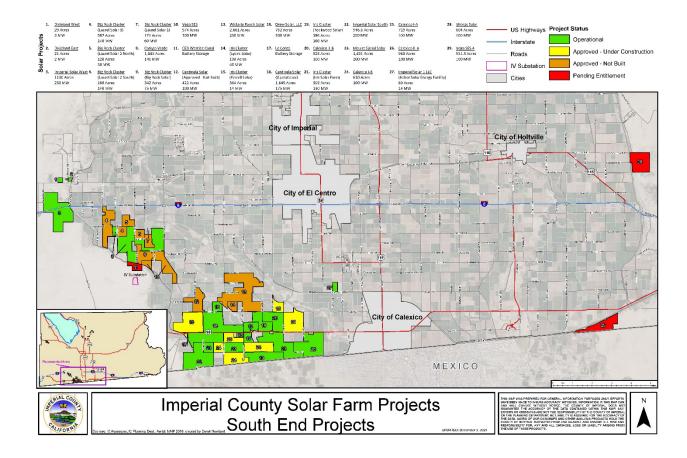
Exhibit 8 - California Department of Forestry and Fire Protection, Office of the State Fire Marshall's November 2010 manual for Fire Operations for Photovoltaic Emergencies.

Exhibit 9 – Milham, S., 2011, "Attention Deficit Hyperactivity Disorder and Dirty Electricity," Journal of Developmental and Behavioral Pediatrics.

Exhibit 10 - Milham, S. & L.L. Morgan, 2008, "A New Electromagnetic Exposure Metric: High Frequency Voltage Transients Associated with Increased Cancer Incidence in Teachers in a California School," American Journal of Industrial Medicine.

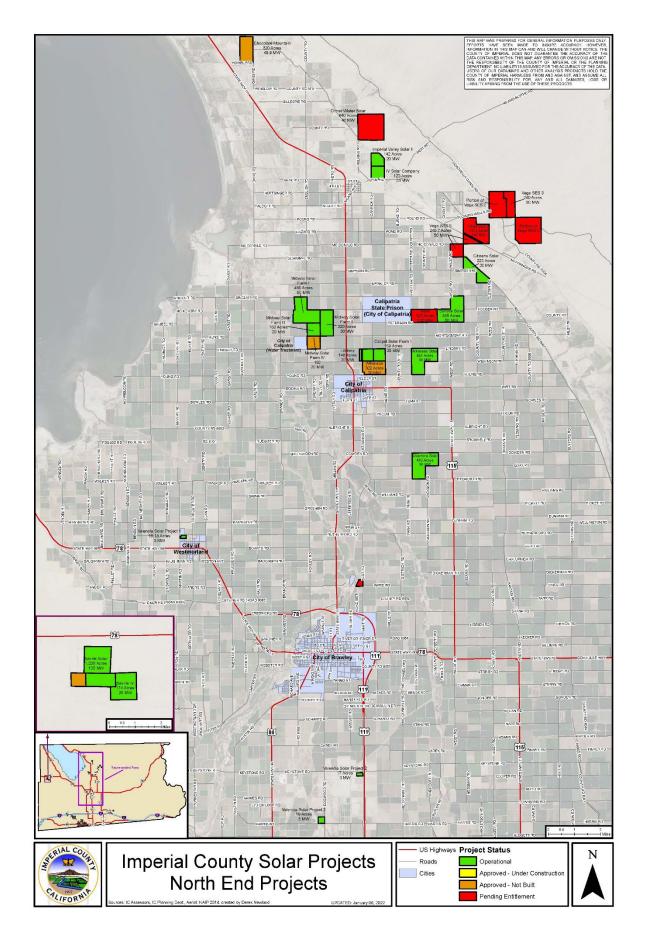
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EXHIBIT 1



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EXHIBIT 2



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EXHIBIT 3

Connie L. Valenzuela Agricultural Commissiones Scaler of Weights and Measures

Linda S. Evens Assistant Agricultural Commissioner/ Assc. Sealer of Weights and Measures



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February 25, 2011

Armando G. Villa Planning & Development Services Director 801 Main Street El Centro, CA 92243

RE: CUP 10-0035 8 Minutenergy Renewables, LLC, Calipatria Salar Farm II

The project entails the construction, development and operation of a ground mounted 50 MW Photoveltale solar energy facility. The proposed solar plant will convert approximately 563 acres of privately owned farmland to non-farm use. The project will be located approximately one mile north of Calipatria, California in Imperial County and is bounded by Blair Road to the east, E. Peterson Road to the north, W. Lindsey Road to the south, and the Southern Pacific Railroad to the west. Agricultural lends lie to the immediate north, south, east and west of the project. The Calipatria State Prison is located to the northeast of the project site. An algae farm (Earthrise Farms) is located adjacent to the northwest corner of the site across the Southern Pacific Railroad tracks.

The California Department of Conservation has classified the property as Parmland of Statewide Importance. This farmland supports crops that contribute directly to Imperial County's \$1.45 billion gross agricultural production value. Temporary or permanent removal of any farmland out of production would have a direct negative impact on employment, income, sales and as revenue.

During the construction phase and perhaps afterwards depending on whether this project will have some level of permanent staffing, neighboring agricultural operations would be impacted and restricted in their ability to use some pesticides or some pesticide application methods. Also, any complaints received by the construction site regarding nearby agricultural operations would need to be investigated, costs incurred to conduct investigations into incidents and complaints are not directly reinformed by the state.

Since the project will be surrounded by farmland it will be exposed to higher their normal levels of dust and potential posteriolds drift which will likely increase the cleaning requirements of the pencis.

The land under the solar panels could harbor pests including noxious weeds, plant diseases, insects, and vertebrates which are derimental to agriculture and could cause damage to adjacent fields and crops. This could be a problem if a cover crop is used for dust control and needs to be addressed or mitigated. In addition to direct crop damage caused by pests, if these solar panels are located next to or near any produce or organic fields, they could create food safety issues (i.e. E. coli in spinach caused by minust drapping getting into the field). Many produce growers today have to comply with Leafy Greens Agreements to easure produce safety.

lincerely.

Connic L. Valenzicia
Agricultural Commissioner
Scaler of Weights and Measures

received

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EXHIBIT 4

Avian Mortality at Solar Energy Facilities in Southern California: A Preliminary Analysis

Rebecca A. Kagan, Tabitha C. Viner, Pepper W. Trail, and Edgard O. Espinoza National Fish and Wildlife Forensics Laboratory

Executive Summary

This report summarizes data on bird mortality at three solar energy facilities in southern California: Desert Sunlight, Genesis, and Ivanpah. These facilities use different solar technologies, but avian mortality was documented at each site. Desert Sunlight is a photovoltaic facility, Genesis employs a trough system with parabolic mirrors, and Ivanpah uses a power tower as a focal point for solar flux.

FINDINGS

Trauma was the leading cause of death documented for remains at the Desert Sunlight and Genesis sites. Trauma and solar flux injury were both major causes of mortality at the Ivanpah site. Exposure to solar flux caused singeing of feathers, which resulted in mortality in several ways. Severe singeing of flight feathers caused catastrophic loss of flying ability, leading to death by impact with the ground or other objects. Less severe singeing led to impairment of flight capability, reducing ability to forage and evade predators, leading to starvation or predation. Our examinations did not find evidence for significant tissue burns or eye damage caused by exposure to solar flux.

Cause of Death			Desert	
	Ivanpah	Genesis	Sunlight	Total
Solar Flux	47	0	0	47
Impact trauma	24	6	19	49
Predation trauma	5	2	15	22
Trauma of undetermined cause	14	0	0	14
Electrocution	1	0	0	1
Emaciation	1	0	0	1
Undetermined (remains in poor condition)	46	17	22	85
No evident cause of death	3	6	5	14
Total	141	31	61	233

These solar facilities appear to represent "equal-opportunity" hazards for the bird species that encounter them. The remains of 71 species were identified, representing a broad range of ecological types. In body size, these ranged from hummingbirds to pelicans; in ecological type from strictly aerial feeders

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(swallows) to strictly aquatic feeders (grebes) to ground feeders (roadrunners) to raptors (hawks and owls). The species identified were equally divided among resident and non-resident species, and nocturnal as well as diurnal species were represented. Although not analyzed in detail, there was also significant bat and insect mortality at the Ivanpah site, including monarch butterflies. It appears that Ivanpah may act as a "mega-trap," attracting insects which in turn attract insect-eating birds, which are incapacitated by solar flux injury, thus attracting predators and creating an entire food chain vulnerable to injury and death.

Foraging Zone Residency Status

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SITE	No. Remains	Identifiable Remains	Air	Terr	Water	Resident	Migrant
Ivanpah	141	127	28	85	14	63	64
Genesis	31	30	12	12	6	20	10
Desert Sun	61	56	7	22	27	18	38
TOTALS	233	213	47	119	47	101	112

CONCLUSIONS AND RECOMMENDATIONS

In summary, three main causes of avian mortality were identified at these facilities: impact trauma, solar flux, and predation. Birds at all three types of solar plants were susceptible to impact trauma and predators. Predation was documented mostly at the photovoltaic site, and in many cases appeared to be associated with stranding or nonfatal impact trauma with the panels, leaving birds vulnerable to resident predators. Solar flux injury, resulting from exposures to up to 800° F, was unique to the power tower facility. Our findings demonstrate that a broad ecological variety of birds are vulnerable to morbidity and mortality at solar facilities, though some differential mortality trends were evident, such as waterbirds at Desert Sunlight, where open water sources were present; and insectivores at Ivanpah, where insects are attracted to the solar tower.

Specific hazards were identified, including vertically-oriented mirrors or other smooth reflective panels; water-like reflective or polarizing panels; actively fluxing towers; open bodies of water; aggregations of insects that attracted insectivorous birds; and resident predators. Making towers, ponds and panels less attractive or accessible to birds may mitigate deaths. Specific actions should include:

Monitoring/detection measures:

- 1) Install video cameras sufficient to provide 360 degree coverage around each tower to record birds (and bats) entering and exiting the flux
- 2) For at least two years (and in addition to planned monitoring protocol), conduct daily surveys for birds (at all three facilities), as well as insects and bats (in the condenser building at Ivanpah) around each tower at the base of and immediately adjacent to the towers in the area cleared of vegetation. Timing of daily surveys can be adjusted to minimize scavenger removal of carcasses as recommended by the TAC. Surveys in the late afternoon might be optimal for bird carcasses, and first light for bat carcasses.

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- 3) Use dogs for monitoring surveys to detect dead and injured birds that have hidden themselves in the brush, both inside and outside the perimeter of the facility
- 4) To decrease removal of carcasses, implement appropriate raven deterrent actions

Bird Mortality Avoidance Measures:

- 1) Increase cleared area around tower at Ivanpah to decrease attractive habitat; at least out to fence
- 2) Retrofit visual cues to existing panels at all three facilities and incorporate into new panel design. These cues should include UV-reflective or solid, contrasting bands spaced no further than 28 cm from each other
- 3) Suspend power tower operation during peak migration times for indicated species
- 4) Avoid vertical orientation of mirrors whenever possible, for example tilt mirrors during washing
- 5) Properly net or otherwise cover ponds
- 6) Place perch deterrent devices where indicated, eg. on tower railings near the flux field
- 7) Employ exclusionary measures to prevent bats from roosting in and around the condenser facility at Ivanpah.

It must be emphasized that we currently have a very incomplete knowledge of the scope of avian mortality at these solar facilities. Challenges to data collection include: large facilities which are difficult to efficiently search for carcasses; vegetation and panels obscuring ground visibility; carcass loss due to scavenging; rapid degradation of carcass quality hindering cause of death and species determination; and inconsistent documentation of carcass history.

To rectify this problem, video cameras should be added to the solar towers to record bird mortality and daily surveys of the area at the base of and immediately adjacent to the towers should be conducted. At all the facilities, a protocol for systematic, statistically-rigorous searches for avian remains should be developed, emphasizing those areas where avian mortality is most likely to occur. Investigation into bat and insect mortalities at the power tower site should also be pursued.

Finally, there are presently little data available on how solar flux affects birds and insects. Studies of the temperatures experienced by objects in the flux; of the effects of high temperatures on feather structure and function; and of the behavior of insects and birds in response to the flux and related phenomena (e.g. "light clouds") are all essential if we are to understand the scope of solar facility effects on wildlife.

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Introduction

The National Fish and Wildlife Forensics Laboratory was requested to determine cause of death for birds found at facilities that generate electricity from solar energy. Solar generating facilities can be classified into three major types: photovoltaic sites, trough systems and solar power towers. There is much written about these systems so this report will not include any technical details, but simply mention the differences and their potential impact on birds.

1) Photovoltaic systems directly convert the sun's light into electricity. The perceived threat to birds is associated with the presence of water ponds which attract birds and from traumatic impact with the photovoltaic cells. An example of this type of solar power plant is Desert Sunlight Solar Farm (AKA First Solar).





2) Trough systems are composed of parabolic mirrors which focus and reflect the sun to a tube that converts the heat from the sun into electricity. The perceived threat to birds is associated with the presence of water ponds which attract birds and from traumatic impact with the trough structures. An example of this type of solar power plant is Genesis Solar Energy Project.

3) Solar power towers use thousands of mirrors to reflect the solar energy to a tower, where water in a boiler is converted to steam, generating the electricity. The perceived threat to birds is associated traumatic impact with the mirrors and the danger associated with the heat produced by the mirrors. An example of this type of solar power plant is Ivanpah Solar Electric Generating System.



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Methods

Carcasses were collected at the different solar power plant sites by either US Fish and Wildlife Service employees or by energy company staff. The collection of the carcasses was opportunistic; that is, not according to a pre-determined sampling schedule or protocol. There was no attempt to quantify the number of carcasses that scavengers or predators removed from the solar facilities' grounds, or to compare the distribution of carcasses inside and outside the boundaries of the solar facility sites.

Additionally, three USFWS/-OLE staff, including two Forensics Lab staff (EOE and RAK), visited the Ivanpah Solar plant from October 21 – 24, 2013. Their on-site observations are included in this report.

A total of 233 birds collected from three different facilities were examined; 141 from a solar thermal power tower site (Ivanpah, Bright Source Inc.), 31 from a parabolic trough site (Genesis, NextEra Energy Inc.) and 61 from a photovoltaic (PV) panel site (Desert Sunlight, First Solar Inc.). Nine of the Ivanpah birds were received fresh; 7 of those were necropsied during a site visit by a Forensics Laboratory pathologist (RAK). The rest of the birds were received frozen and allowed to thaw at room temperature prior to species identification and necropsy. Species determination was made by the Forensics Laboratory ornithologist (PWT) for all birds either prior to necropsy or, for those necropsied on-site, from photos and the formalin-fixed head. All data on carcass history (location of the carcass, date of collection and any additional observations) were transcribed, although these were not available for all carcasses.

As part of the gross pathological examination, whole carcasses were radiographed to help evaluate limb fractures and identify any metal foreign bodies. Alternate light source examination using an Omnichrome Spectrum 9000+ at 570 nm with a red filter helped rule in or out feather burns by highlighting subtle areas of feather charring (Viner et al., 2014). All birds or bird parts from Ivanpah without obvious burns were examined with the alternate light source, as well as any bird reportedly found near a power line and a random sub-sample of the remaining birds from Genesis and Desert Sunlight (Viner, T. C., R. A. Kagan, and J. L. Johnson, 2014, Using an alternate light source to detect electrically singed feathers and hair in a forensic setting. Forensic Science International, v. 234, p. e25-e29).

Carcass quality varied markedly. If carcasses were in good post mortem condition, representative sections of heart, lung, kidney, liver, brain and gastrointestinal tract as well as any tissues with gross lesions were collected and fixed in 10% buffered formalin. Full tissue sets were collected from the fresh specimens. Formalin-fixed tissues were routinely processed for histopathology, paraffin-embedded, cut at 4 µm and stained with hematoxylin and eosin. Tissues from 63 birds were examined microscopically: 41 from Ivanpah, 1 from Genesis and 21 from Desert Sunlight.

Birds with feather burns were graded based on the extent of the lesions. Grade 1 birds had curling of less than 50% of the flight feathers. Grade 2 birds had curling of 50% or more of the flight feathers. Grade 3 birds had curling and visible charring of contour feathers (Figure 1).

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Figure 1: Three grades of flux injury based on extent and severity of burning. Grade 1 (top); Yellow-rumped Warbler with less than 50% of the flight feathers affected (note sparing of the yellow rump feathers). Grade 2 (middle); Northern Rough-winged Swallow initially found alive but unable to fly, with greater than 50% of the flight feathers affected. Grade 3 (bottom); MacGillivray's Warbler with charring of feathers around the head, neck, wings and tail.

Bird Species Recovered at Solar Power Facilities

Tables 1-4 and Appendix 1 summarize 211 identifiable bird remains recovered from the three solar facilities included in this study. These birds constitute a taxonomically diverse assemblage of 71 species, representing a broad range of ecological types. In body size, these species ranged from hummingbirds to pelicans; in ecological type from strictly aerial feeders (e.g. swifts and swallows) to strictly aquatic feeders (pelicans and cormorants) to ground feeders (roadrunners) to raptors (hawks and owls). The species identified were equally divided among resident and non-

resident species. Nocturnal as well as diurnal species were represented.

In Tables 1-4 and Appendix 1, bird species are categorized into very general ecological types by foraging zone and residency status. Foraging Zones were "air" (a significant portion of foraging activity performed in the air), "terrestrial" (including foraging both in vegetation and on the ground), and "water" (foraging associated with water, including waders as well as aquatic birds). Residency Status was "resident" (for breeding or year-round residents) and "migrant" (for both passage migrants and non-breeding-season residents). For a number of species, the appropriate classification for residency status was uncertain, due to a lack of detailed knowledge of the sites. The present classification is based on published range maps, and is subject to revision as more information becomes available.

This dataset is not suitable for statistical analysis, due to the opportunistic and unstandardized collection of avian remains at the facilities, and the lack of baseline data on bird diversity and abundance at each site. Nevertheless, a few conclusions can be noted. First, these data do not support the idea that these solar facilities are attracting particular species. Of the 71 bird species identified in remains, only five species were recovered from all three sites. These five were American Coot, Mourning Dove, Lesser Nighthawk, Tree Swallow, and Brown-headed Cowbird, again emphasizing the ecological variety of birds vulnerable to mortality at the solar facilities. Over two-thirds (67%) of the species were found at only a single site

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(Appendix 1). That being said, the Desert Sunlight facility had particularly high mortality among waterbirds, suggesting a need to render the ponds at that site inaccessible or unattractive to these species.

The diversity of birds dying at these solar facilities, and the differences among sites, suggest that there is no simple "fix" to reduce avian mortality. These sites appear to represent "equal-opportunity" mortality hazards for the bird species that encounter them. Actions to reduce or mitigate avian mortality at solar facilities will need to be designed on a site-specific basis, and will require much more data on the bird communities at each site, and on how mortality is occurring. Carefully-designed mortality studies might reveal significant patterns of vulnerability that are not evident in these data.

Table 1. Summary data on avian mortality at the three solar sites included in this study. See summary for discussion of Foraging Zone and Residency Status categories.

				Foraging Zone		Residency Status		
SITE	No. Species	No. Remains	Identifiable Remains	Air	Terr	Water	Resident	Migrant
Ivanpah	49	141	127	26	85	14	63	64
Genesis	15	31	30	12	12	6	20	10
Desert Sun	33	61	56	7	22	27	18	38
TOTALS	71	233	213	47	119	47	101	112

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Table 2. Species identified from avian remains at the Desert Sunlight photovoltaic solar facility. MNI = minimum number of individuals of each species represented by the identifiable remains. In some cases (e.g. Cinnamon/Blue-winged Teal), closely related species could not be distinguished based on the available remains, but the Foraging Zone and Residency Status could still be coded, due to the ecological similarities of the species involved. Total identified birds = 56.

DESERT SUNLIGHT		Zone	Residency	MNI
Pied-billed Grebe	Podilymbus podiceps	water	migrant	1
Eared Grebe	Podiceps nigricollis	water	migrant	3
Sora	Porzana carolina	water	migrant	1
American Avocet	Recurvirostra americana	water	migrant	1
Cinnamon/Blue-winged Teal	Anas discors/clypeata	water	migrant	1
Western Grebe	Aechmophorus occidentalis	water	migrant	9
Brown Pelican	Pelecanus occidentalis	water	migrant	2
Double-crested Cormorant	Phalacrocorax auritus	water	migrant	2
Black-crowned Night-Heron	Nycticorax nycticorax	water	migrant	1
Yuma Clapper Rail	Rallus longirostris	water	resident	1
American Coot	Fulica americana	water	migrant	5
Mourning Dove	Zenaida macroura	terr	resident	3
White-winged Dove	Zenaida asiatica	terr	resident	1
Lesser Nighthawk	Chordeiles acutipennis	air	resident	2
Common Poorwill	Phalaenoptilus nuttallii	air	resident	1
Costa's Hummingbird	Calypte costae	air	resident	1
Ash-throated Flycatcher	Myiarchus cinerascens	air	resident	1
Black-throated/Sage Sparrow	Amphispiza sp.	terr	resident	1
Black Phoebe	Sayornis nigricollis	air	resident	1
Loggerhead Shrike	Lanius ludovicianus	terr	resident	2
Common Raven	Corvus corax	terr	resident	1
Horned Lark	Eremophila alpestris	terr	migrant	1
Tree Swallow	Tachycineta bicolor	air	migrant	1
Townsend's Warbler	Setophaga townsendi	terr	migrant	2
Common Yellowthroat	Geothlypis trichas	terr	migrant	1
Savannah Sparrow	Passerculus sandwichensis	terr	migrant	1
Yellow-headed Blackbird	Xanthocephalus xanthocephalus	terr	migrant	1
Wilson's Warbler	Cardellina pusilla	terr	migrant	2
Western Tanager	Piranga ludoviciana	terr	migrant	2
Black-headed Grosbeak	Pheucticus melanocephalus	terr	migrant	1
Great-tailed Grackle	Quiscalus mexicanus	terr	resident	2
Brown-headed Cowbird	Molothrus ater	terr	resident	1

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Table 3. Species identified from avian remains at the Genesis trough system solar facility. Total identified birds = 30.

GENESIS		Zone	Residency	MNI
Eared Grebe	Podiceps nigricollis	water	migrant	2
Great Blue Heron	Ardea herodias	water	migrant	1
American Kestrel	Falco sparverius	air	resident	1
Ring-billed Gull	Larus delawarensis	water	migrant	2
California Gull	Larus californianus	water	resident	1
White-winged Dove	Zenaida asiatica	terr	resident	1
Lesser Nighthawk	Chordeiles acutipennis	air	resident	2
Say's Phoebe	Sayornis saya	air	resident	2
Tree Swallow	Tachycineta bicolor	air	migrant	2
Cliff Swallow	Petrochelidon pyrrhonota	air	resident	5
Hermit Warbler	Setophaga occidentalis	terr	migrant	1
Black-headed Grosbeak	Pheucticus melanocephalus	terr	migrant	1
Chipping Sparrow	Spizella passerina	terr	resident	1
Bullock's Oriole	Icterus bullockii	terr	resident	2
Brown-headed Cowbird	Molothrus ater	terr	resident	6

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Table 4. Species identified from a vian remains at the Ivanpah power tower solar facility. Total identified birds = 127

IVANPAH		Zone	Residency	MNI
Cinnamon Teal	Anas cyanoptera	water	migrant	4
Cooper's Hawk	Accipiter cooperii	air	migrant	1
Red-shouldered Hawk	Buteo lineatus	terr	migrant	1
American Kestrel	Falco sparverius	air	resident	1
Peregrine Falcon	Falco peregrinus	air	resident	1
American Coot	Fulica americana	water	migrant	7
Sora	Porzana carolina	water	migrant	1
Spotted Sandpiper	Actitis maculatus	water	migrant	2
Greater Roadrunner	Geococcyx californianus	terr	resident	5
Yellow-billed Cuckoo	Coccyzus americanus	terr	migrant	1
Mourning Dove	Zenaida macroura	terr	resident	11
Barn Owl	Tyto alba	terr	resident	1
Lesser Nighthawk	Chordeiles acutipennis	air	resident	3
Common Poorwill	Phalaenoptilus nuttallii	air	resident	1
White-throated Swift	Aeronautes saxatalis	air	resident	1
Allen's/Rufous Hummingbird	Selasphorus sp.	air	migrant	1
Northern Flicker	Colaptes auratus	terr	resident	1
Ash-throated Flycatcher	Myiarchus cinerascens	air	resident	1
Loggerhead Shrike	Lanius ludovicianus	terr	resident	3
Warbling Vireo	Vireo gilvus	terr	migrant	1
Common Raven	Corvus corax	terr	resident	2
Northern Rough-winged Swallow	Stelgidopteryx serripennis	air	migrant	2
Tree Swallow	Tachycineta bicolor	air	migrant	2
Verdin	Auriparus flaviceps	terr	resident	3
Blue-gray Gnatcatcher	Polioptila caerulea	terr	resident	1
Northern Mockingbird	Mimus polyglottos	terr	resident	1
American Pipit	Anthus rubescens	terr	migrant	4
Orange-crowned Warbler	Oreothlypis celata	terr	migrant	1
Lucy's Warbler	Oreothlypis luciae	terr	resident	1
Black-throated Gray Warbler	Setophaga nigrescens	terr	migrant	1
Yellow-rumped Warbler	Setophaga coronata	air	migrant	14
Townsend's Warbler	Setophaga townsendi	terr	migrant	2
Yellow Warbler	Setophaga petechia	terr	migrant	1
Black-and-white Warbler	Mniotilta varia	terr	migrant	1
Wilson's Warbler	Cardellina pusilla	terr	migrant	2
MacGillivray's Warbler	Oporornis tolmei	terr	migrant	1
Western Tanager	Piranga ludoviciana	terr	migrant	2
Lazuli Bunting	Passerina amoena	terr	migrant	1
Blue Grosbeak	Passerina caerulea	terr	resident	1
Green-tailed Towhee	Pipilo chlorurus	terr	migrant	1
Brewer's Sparrow	Spizella breweri	terr	resident	3
Chipping Sparrow	Spizella passerina	terr	resident	3
Black-throated Sparrow	Amphispiza bilineata	terr	resident	3
Savannah Sparrow	Passerculus sandwichensis	terr	migrant	2
White-crowned Sparrow	Zonotrichia leucophrys	terr	migrant	6
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IVANPAH		Zone	Residency	MNI
Pine Siskin	Spinus pinus	terr	migrant	1
House Finch	Carpodacus mexicanus	terr	resident	13
Brown-headed Cowbird	Molothrus ater	terr	resident	1
Great-tailed Grackle	Quiscalus mexicanus	terr	resident	3

Cause of Death of Birds Found at the Solar Power Plants

Photovoltaic facility (Desert Sunlight):

Sixty-one birds from 33 separate species were represented from Desert Sunlight. Due to desiccation and scavenging, a definitive cause of death could not be established for 22 of the 61 birds (see Table 5). Feathers could be examined in all cases, however, and none of the 61 bird remains submitted from the PV facility had visible evidence of feather singeing, a clear contrast with birds found at Ivanpah.

Blunt force impact trauma was determined to have been the cause of death for 19 Desert Sunlight birds including two Western Grahes.

including two Western Grebes (Aechmophorus occidentalis) and one each of 16 other species. Impact (blunt force) trauma is diagnosed by the presence of fractures and internal and/or external contusions. In particular, bruising around the legs, wings and chest are consistent with crash-landings while fractures of the head and/or neck are consistent with high-velocity, frontal impact (such as may result from impacting a mirror).

Predation was the immediate cause of death for 15 birds. Lesions supporting the finding of predation included decapitation or missing parts of the body with associated hemorrhage (9/15), and lacerations of the skin and pectoral muscles. Eight of the predated birds from Desert Sunlight were

Figure 2: Predation trauma (top) resulting in traumatic amputation of the head and neck (American Avocet) and impact trauma (bottom) causing bruising of the keel ridge of the sternum (Brown Pelican).





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grebes, which are unable to easily take off from land. This suggests a link between predation and stranding and/or impact resulting from confusion of the solar panels with water (see Discussion).

Parabolic trough facility (Genesis):

Thirty-one birds were collected from this site. There were 15 species represented. Those found in the greatest numbers were Brown-headed Cowbirds and Cliff Swallows, though no more than 6 individuals from any given species were recovered. Overall, carcass quality was poor and precluded definitive cause of death determination in 17/31 birds (Table 5). Identifiable causes of death consisted of impact trauma (6/31) and predation trauma (2/31). Necropsy findings were similar to those at Desert Sunlight with fractures and hemorrhage noted grossly. Predation trauma was diagnosed in two birds, a Cliff Swallow and a Ring-billed Gull.

Power tower facility (Ivanpah):

Ivanpah is the only facility in this study that produces solar flux, which is intense radiant energy focused by the mirror array on the power-generating tower. Objects that pass through this flux, including insects and birds, encounter extreme heat, although the extent of heating depends on many variables, including the duration of exposure and the precise location in the flux beam.

From Ivanpah, 141 birds were collected and examined. Collection dates spanned a period of one year and five months (July 2012 to December 2013) and included at least seven months of construction during which time the towers were not actively fluxing (2013). There were 49 species represented (Table 4). Those found in the greatest numbers were Yellow-rumped Warblers (Setophaga coronata; 14), House Finches (Carpodacus mexicanus; 13), Mourning Doves (Zenaida macroura; 11) and American Coots (Fulica americana; 7). Yellow-rumped Warblers and House Finches were found exclusively at the power tower site.

Solar flux injury was identified as the cause of death in 47/141 birds. Solar flux burns manifested as feather curling, charring, melting and/or breakage and loss. Flight feathers of the tail and/or wings were invariably affected. Burns also tended to occur in one or more of the following areas; the sides of the body (axillae to pelvis), the dorsal coverts, the tops and/sides of the head and neck and the dorsal body wall (the back). Overlapping portions of feathers and light-colored feathers were often spared (Figures 3 and 4).

Figure 3: contour feather from the back of a House Finch with Grade 3 solar flux injury. The feather has curling and charring limited to the exposed tip.



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Figure 4: Feather from a Peregrine Falcon with Grade 2 solar flux injury. Note burning of dark feather bands with relative sparing of light bands.

The yellow and red rumps of Yellow-rumped Warblers and House Finches respectively remained strikingly unaffected (See Figure 1). Charring of head feathers, in contrast, was generally diffuse across all color patterns. A pattern of spiraling bands of curled feathers across or around the body and wings was often apparent.

Table 5. Cause of death (COD) data

Cause of Death			Desert	
	Ivanpah	Genesis	Sunlight	Total
Solar Flux	47	0	0	47
Impact trauma	24	6	19	49
Predation trauma	5	2	15	22
Trauma of undetermined cause	14	0	0	14
Electrocution	1	0	0	1
Emaciation	1	0	0	1
Undetermined (remains in poor condition)	46	17	22	85
No evident cause of death	3	6	5	14
Total	141	31	61	233

Eight birds were assigned a feather damage Grade of 1 with curling of less than 50% of the flight feathers. Six of these had other evidence of acute trauma (75%). Five birds were Grade 2, including three birds that were found alive and died shortly afterwards. Of these birds, 2 (the birds found dead) also had evidence of acute trauma. Twenty-eight birds were Grade 3; with charring of body feathers. Of these birds, 21/28

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(28%) had other evidence of acute trauma. Remaining carcasses (6) were incomplete and a grade could not be assigned.

Twenty-nine birds with solar flux burns also had evidence of impact trauma. Trauma consisted of skull fractures or indentations (8), sternum fractures (4), one or more rib fractures (4), vertebral fractures (1), leg fracture (3), wing fracture (1) and/or mandible fracture (1). Other signs of trauma included acute macroscopic and/or microscopic internal hemorrhage. Location found was reported for 39 of these birds; most of the intact carcasses were found near or in a tower. One was found in the inner heliostat ring and one was found (alive) on a road between tower sites. The date of carcass collection was provided for 42/47. None were found prior to the reported first flux (2013).



Figure 5: The dorsal aspect of the wing from a Peregrine Falcon (the same bird as shown in Figure 4) with Grade 2 lesions. Note extensive curling of feathers without visible charring. This bird was found alive, unable to fly, emaciated and died shortly thereafter. These findings demonstrate fatal loss of function due to solar flux exposure in the absence of skin or other soft tissue burns.

Among the solar flux cases, a variety of bird species were affected though all but one (a raptor) was a passerine (Appendix 2). House Finches and yellow-rumped Warblers were most often represented (10/47 and 12/47 respectively). For the birds in which species could be determined (41/47), insects were a major

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dietary component in all but two species. These were an unidentified hummingbird (*Selasphorus*) species (known to include insects in the diet) and a Peregrine Falcon (a species that feeds on small birds).

Four birds were reportedly found alive and taken to a wildlife rehabilitation center where they died one to a few days later (exact dates were not consistently provided). Three had Grade 2 feather burns and one had Grade 3 feather burns. None had other evidence of trauma. Body condition was reduced in all of the birds (two considered thin and two emaciated) based on a paucity of fat stores and depletion of skeletal muscling. The four birds were of four different species and consisted of three passerines and one raptor.

The second most commonly diagnosed cause of death at the Ivanpah facility was impact (or blunt force) trauma (24/141 birds). Necropsy findings were as previously described at the Desert Sunlight facility. Impact marks were reported on heliostat mirrors adjacent to the carcasses in 5 cases and mirrors were described as being vertically-oriented in 5 cases. Specific carcass locations were reported for 18 of the birds. Those birds were found in a variety of areas; below heliostats (8/18), in or near tower and powerblock buildings (4/18), on roads (2/18), below power lines (2/18), in the open (1/18) and by a desert tortoise pen (1/18).

Predation was determined to be the cause of death for five of the birds. A coot and a Mourning Dove were found with extensive trauma and hemorrhage to the head and upper body consisting of lacerations, crush trauma and/or decapitation. One of the birds (an American Coot) was found near a kit fox shelter site. One bird (Northern Mockingbird) was found near the fence line and the third (a Mourning Dove) in an alley way. Two more birds (an unidentified sparrow and an American Pipit) were observed being eaten by one of the resident Common Ravens.

Discussion of Cause of Death of Birds Found at the Solar Power Plants

Impact trauma:

Sheet glass used in commercial and residential buildings has been well-established as a hazard for birds, especially passerines (Klem 1990, 2004, 2006; Loss et al. 2014). A recent comprehensive review estimated that between 365-988 million birds die annually by impacting glass panels in the United States alone (median estimate 599 million; Loss et al. 2014). Conditions that precipitate window strike events include the positioning of vegetation on either side of the glass and the reflective properties of the window. Glass panels that reflect trees and other attractive habitat are involved in a higher number of bird collisions.

The mirrors and photovoltaic panels used at all three facilities are movable and generally directed upwardly, reflecting the sky. At the Ivanpah facility, when heliostats are oriented vertically (typically for washing or installation, personal communication, RAK) they appear to pose a greater risk for birds. Of the eight birds reported found under a heliostat, heliostats were vertically-oriented in at least 5 cases. (D Klem Jr., DC Keck, KL Marty, AJ Miller Ball, EE Niciu, and CT Platt. 2004. Effects of window angling, feeder placement, and scavengers on avian mortality at plate glass. Wilson Bulletin, 116(1):69-73; D Klem Jr. 2006. Glass: A deadly conservation issue for birds. Bird Observer 34(2):73-81; D Klem Jr. 1990.

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Collisions between birds and windows: mortality and prevention. Journal of Field Ornithology 61:120–128; Loss, S.R., T. Will, S.S.Loss, and P.P. Marra. 2014. Bird-building collisions in the United States: Estimates of annual mortality and species vulnerability. Condor 116: 8-23). Studies with aquatic insects have found that vertically-oriented black glass surfaces (similar to solar panels) produced highly polarized reflected light, making them highly attractive (Kriska, G., P. Makik, I. Szivak, and G. Horvath. 2008. Glass buildings on river banks as "polarized light traps" for mass-swarming polarotactic caddis flies. Naturwissenschaften 95: 461-467).

A desert environment punctuated by a large expanse of reflective, blue panels may be reminiscent of a large body of water. Birds for which the primary habitat is water, including coots, grebes, and cormorants, were over-represented in mortalities at the Desert Sunlight facility (44%) compared to Genesis (19%) and Ivanpah (10%). Several factors may inform these observations. First, the size and continuity of the panels differs between facilities. Mirrors at Ivanpah are individual, 4×8 ° panels that appear from above as stippling in a desert background (Figure 6). Photovoltaic panels at Desert Sunlight are long banks of adjacent 27.72×47.25 ° panels (70 x 120 cm), providing a more continuous, sky/water appearance. Similarly, troughs at Genesis are banks of 5×5.5 ° panels that are up to 49-65 meters long.



Figure 6: The Ivanpah Solar Electric Generating System as seen via satellite. The mirrored panels are 5×8 feet.

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There is growing concern about "polarized light pollution" as a source of mortality for wildlife, with evidence that photovoltaic panels may be particularly effective sources of polarized light in the environment (see Horvath et al. 2010. Reducing the maladaptive attractiveness of solar panels to polarotactic insects. Conservation Biology 24: 1644-1653, and ParkScience, Vol. 27, Number 1, 2010; available online at: http://www.nature.nps.gov/parkscience/index.cfm?ArticleID=386&ArticleTypeID=5; as well as discussion of this issue in the Desert Sunlight Final Environmental Impact Statement, Chapter 4, pp. 14-15).

Variables that may affect the illusory characteristics of solar panels are structural elements or markings that may break up the reflection. Visual markers spaced at a distance of 28 cm or less have been shown to reduce the number of window strike events on large commercial buildings (City of Toronto Green Development Standard; Bird-friendly development guidelines. March 2007). Mirrors at the Ivanpah facility are unobscured by structures or markings and present a diffuse, reflective surface. Photovoltaic panels at Desert Sunlight are arranged as large banks of small units that are 60 x 90 cm. The visually uninterrupted expanse of both these types of heliostat is larger than that which provides a solid structure visual cue to passerines. Parabolic troughs at Genesis have large, diffusely reflective surfaces between seams that periodically transect the bank of panels at 5.5° intervals. Structures within the near field, including the linear concentrator and support arms, and their reflection in the panels and may provide a visual cue to differentiate the panel as a solid structure.

The paper by Horvath et al cited above provides experimental evidence that placing a white outline and/or white grid lines on solar panels significantly reduced the attractiveness of these panels to aquatic insects, with a loss of only 1.8% in energy-producing surface area (p. 1651). While similar detailed studies have yet to be carried out with birds, this work, combined with the window strike results, suggest that significant reductions in avian mortality at solar facilities could be achieved by relatively minor modifications of panel and mirror design. This should be a priority for further research.

Finally, ponds are present on the property of the Desert Sunlight and Genesis facilities. The pond at Genesis is netted, reducing access by migratory birds, while the pond at Desert Sunlight is open to flighted wildlife. Thus, birds are both attracted to the water feature at Desert Sunlight and habituated to the presence of an accessible aquatic environment in the area. This may translate into the misinterpretation of a diffusely reflected sky or horizonal polarized light source as a body of water.

Stranding and Predation:

Predation is likely linked to panel-related impact trauma and stranding. Water birds were heavily over-represented in predation mortalities at Desert Sunlight. Of the 15 birds that died due to predation, 14 make their primary habitat on water (coots, grebes, a cormorant, and an avocet). A single White-winged Dove was the only terrestrial-based predation mortality in the submitted specimens. This is in contrast to blunt trauma mortalities at Desert Sunlight in which 8 of the 19 birds determined to have died of impact trauma were water species.

Locations of the birds when found dead were noted on several submissions. Of the birds that died of predation for which locations were known, none were located near ponds. The physiology of several of

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these water birds is such that locomotion on land is difficult or impossible. Grebes in particular have very limited mobility on land and require a run across water in order to take off (Jehl, J. R., 1996. Mass mortality events of Eared Grebes in North America. Journal of Field Ornithology 67: 471-476). Thus, these birds likely did not reach their final location intentionally. Ponds at the PV and trough sites are fenced, prohibiting terrestrial access by predators. Birds on the water or banks of the pond are inaccessible to resident predators. Therefore, it is unlikely that the birds were captured at the pond and transported by a predator into the area of the panels. Attempts to land or feed on the panels because of their deceptive appearance may have injured the birds to the point that they could not escape to safety, or inadvertently stranded the birds on a substrate from which they could not take flight. We believe that an inability to quickly flee after striking the panels and stranding on the ground left these birds vulnerable to opportunistic predators. At least two types of predators, kit foxes and ravens, have been observed in residence at the power tower and PV facilities and ravens have been reported at the trough site (personal communication and observation, RAK). Additionally, histories for multiple birds found at the tower site document carcasses found near kit fox shelters or being eaten or carried by a raven.

Solar Flux:

Avian mortality due to exposure to solar flux has been previously explored and documented (McCrary, M. D., McKernan, R. L., Schreiber, R. W., Wagner, W. D., and Sciarrotta, T. C. Avian mortality at a solar energy power plant. Journal of Field Ornithology, 57(2): 135-141). Solar flux injury to the birds of this report, as expected, occurred only at the power tower facility. Flux injury grossly differed from other sources of heat injury, such as electrocution or fire. Electrocution injury requires the bridging of two contact points and is, therefore, seen almost exclusively in larger birds such as raptors. Contact points tend to be on the feet, carpi and/or head and burns are often found in these areas. Electrocution causes deep tissue damage as opposed to the surface damage of fire or solar flux. Other sequelae include amputation of limbs with burn marks on bone, blood vessel tears and pericardial hemorrhage. Burns from fires cause widespread charring and melting of feathers and soft tissues and histopathologic findings of soot inhalation or heat damage to the respiratory mucosa. None of these were characteristics of flux injury. In the flux cases small birds were over-represented, had burns generally limited to the feathers and internal injuries attributable to impact. Flux injury inconsistently resulted in charring, tended to affect feathers along the dorsal aspects of the wings and tail, and formed band-like patterns across the body (Divincenti, F. C., J. A. Moncrief, and B. A. Pruitt. 1969. Electrical injuries: a review of 65 cases. The Journal of Trauma 9: 497-507).

Proposed mechanisms of solar flux-related death follow one or a combination of the following pathways:

- · impact trauma following direct heat damage to feathers and subsequent loss of flight ability
- starvation and/or thermoregulatory dysfunction following direct heat damage to feathers
- shock
- soft tissue damage following whole-body exposure to high heat
- ocular damage following exposure to bright light.

Necropsy findings from this study are most supportive of the first three mechanisms.

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Loss of feather integrity has effects on a bird's ability to take off, land, sustain flight and maneuver. Tail feathers are needed for lift production and maneuverability, remiges are needed for thrust and lift and feathers along the propatagium and coverts confer smoothness to the avian airfoil. Shortening of primary flight feathers by as little as 1.6 cm with loss of secondary and tertiary remiges has been shown to eliminate take-off ability in house sparrows further demonstrating the importance of these feathers (Brown, R. E., and A. C. Cogley, 1996. Contributions of the propatagium to avian flight: Journal of Experimental Zoology 276: 112-124). Loss of relatively few flight feathers can, therefore, render a bird unable or poorly-able to fly. Birds encountering the flux field at Ivanpah may fall as far as 400 feet after feather singeing. Signs of impact trauma were often observed in birds with feather burns and are supportive of sudden loss of function (Beaufrere, H., 2009. A review of biomechanic and aerodynamic considerations of the avian thoracic limb. Journal of Avian Medicine and Surgery 23: 173-185).

Birds appear to be able to survive flux burns in the short term, as evidenced by the collection of several live birds with singed feathers. Additionally, Forensic Lab staff observed a falcon or falcon-like bird with a plume of smoke arising from the tail as it passed through the flux field. Immediately after encountering the flux, the bird exhibited a controlled loss of stability and altitude but was able to cross the perimeter fence before landing. The bird could not be further located following a brief search (personal observation, RAK and EOE). Birds that initially survive the flux exposure and are able to glide to the ground or a perch may be disabled to the point that they cannot efficiently acquire food, escape predators or thermoregulate. Observations of emaciation in association with feather burns in birds found alive is supportive of debilitation subsequent to flux exposure. More observational studies and follow-up are required to understand how many birds survive flux exposure and whether survival is always merely short-term. As demonstrated by the falcon, injured birds (particulary larger birds), may be ambulatory enough to glide or walk over the property line indicating a need to include adjacent land in carcass searches.

There was evidence of acute skin burns on the heads of some of the Grade 3 birds that were found dead. But interestingly, tissue burn effects could not be demonstrated in birds known to have survived short periods after being burned. Hyperthermia causing instantaneous death manifests as rapid burning of tissue, but when death occurs a day or later there will be signs of tissue loss, inflammation, proteinic exudate and/or cellular death leading to multisystemic organ failure. The beginnings of an inflammatory response to injury can be microscopically observed within one to a few hours after the insult and would have been expected in any of the four birds found alive. Signs of heat stroke or inhalation of hot air should have been observable a day or more after the incident. Rather, in these cases extensive feather burns on the body largely appeared to be limited to the tips of the feathers with the overlapping portions insulating the body as designed. This, in conjunction with what is likely only a few seconds or less spent in the flux, suggests that skin or internal organ damage from exposure to high temperatures in solar flux may not be a major cause of the observed mortality.

Ocular damage following light exposure was also considered but could not be demonstrated in the submitted birds. In the four birds that initially survived, there were no signs of retinal damage, inflammation or other ocular trauma. Given the small sample size, this does not preclude sight impairment as a possible sequela but clinical monitoring of survivors would be needed to draw more definitive conclusions.

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Other/Undetermined:

Powerline electrocution was the cause of death for one bird (a juvenile Common Raven) at the Ivanpah facility. Electrocution at these solar facilities is a potential hazard but, thus far, appears to be an uncommon cause of death.

Smashed birds (13/233) were found at all three locations. Detailed carcass collection information was provided for 6; all were found on roads. Though poor carcass quality in all cases precluded definitive cause death determination, circumstances and carcass condition suggest vehicle trauma as the cause of deaths. The relatively low numbers of vehicle collisions may be attributed to slow on-site vehicle speeds and light traffic. Vehicle collisions, therefore, do not appear to be a major source of mortality and would be expected to decrease as construction ends.

There was a large number of birds (85/233) for which a cause of death could not be determined due to poor carcass condition. The arid, hot environment at these facilities leads to rapid carcass degradation which greatly hinders pathology examination. Results were especially poor for birds from the Genesis facility, where the cause of death(s) for 23/31 (74%) could not be determined. These results underscore the need for carcasses to be collected soon after death. More frequent, concerted carcass sweeps are advised.

Insect mortality and solar facilities as "mega-traps"

An ecological trap is a situation that results in an animal selecting a habitat that reduces its fitness relative to other available habitats (Robertson, B.A. and R.L. Hutto. 2006. A framework for understanding ecological traps and an evaluation of existing evidence. Ecology 87: 1075-1085; Robertson, B.A., J.S. Rehage, and Sih, A. 2013. Ecological novelty and the emergence of evolutionary traps. Trends in Ecology and Evolution 28: 552-560).

A wide variety of circumstances may create ecological traps, ranging from subtle (songbirds attracted to food resources in city parks, where they are vulnerable to unnaturally high populations of predators) to direct (birds are attracted to oil-filled ponds, believing it to be water, and become trapped). It appears that solar flux facilities may act as "mega-traps," which we define as artificial features that attract and kill species of multiple trophic layers. The strong light emitted by these facilities attract insects, which in turn attract insect-eating birds, which are incapacitated by solar flux injury, thus attracting predators and creating an entire food chain vulnerable to injury and death.

OLE staff observed large numbers of insect carcasses throughout the Ivanpah site during their visit. In some places there were hundreds upon hundreds of butterflies (including monarchs, *Danaus plexippus*) and dragonfly carcasses. Some showed singeing, and many appeared to have just fallen from the sky. Careful observation with binoculars showed the insects were active in the bright area around the boiler at the top of the tower. It was deduced that the solar flux creates such a bright light that it is brighter than the surrounding daylight. Insects were attracted to the light and could be seen actively flying the height of the tower. Birds were also observed feeding on the insects. At times birds flew into the solar flux and ignited. Bird carcasses recovered from the site showed the typical singed feathers. The large populations of insects

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may also attract indigenous bat species, which were seen roosting in structures at the base of the power tower.

Monarch butterflies in North America – both east and west of the Rocky Mountains – have been documented to be in decline (see the North American Monarch Conservation Plan, available at: http://www.mlmp.org/Resources/pdf/5431 Monarch en.pdf). Proposed causes include general habitat loss and specific loss of milkweed, upon which the butterflies feed and reproduce. Considering the numerous monarch butterfly carcasses seen at the Ivanpah facility, it appears that solar power towers could have a significant impact on monarch populations in the desert southwest. Analysis of the insect mortality at Ivanpah, and systematic observations of bird/insect interactions around the power tower, is clearly needed.

Bird species affected by solar flux include both insectivores (e.g. swallows, swifts, flycatchers, and warblers) and raptors that prey on insect-feeding birds. Based on observations of the tower in flux and the finding of large numbers of butterflies, dragonflies and other insects at the base of the tower and in adjacent buildings it is suspected that the bright light generated by solar flux attracts insects, which in turn attracts insectivores and predators of insectivores. Waterbirds and other birds that feed on vegetation were not found to have solar flux burns. Birds were observed perching and feeding on railings at the top of the tower, apparently in response to the insect aggregations there.

Further, dead bats found at the Ivanpah site could be attracted to the large numbers of insects in the area. Nineteen bats from the condenser area of the power tower facility have been submitted to NFWFL for further evaluation. These bats belong to the Vespertilionidae and Molossidae families, which contain species considered by the Bureau of Land Management to be sensitive species in California. Preliminary evaluation revealed no apparent singing of the hair, and analysis is ongoing.

Solar flux and heat associated with solar power tower facilities

Despite repeated requests, we have been unsuccessful in obtaining technical data relating to the temperature associated with solar flux at the Ivanpah facility. The following summarizes the information we have gathered from other sources.

The Ivanpah solar energy generating facility consists of mirrors that reflect sunlight to a tower. In the tower sits a boiler that generates steam which then powers a turbine.

Figure 7 Ivanpah solar power facilities http://ivanpahsolar.com/about

At the top of a 459 foot tall tower sits a boiler (solar receiver) that is heated by the sun rays reflected by 300,000 mirrors, called solar heliostats. When the concentrated sunlight strikes the boiler tubes, it heats the water to create superheated steam. The high temperature steam is then piped from the boiler to a turbine where electricity is generated (http://ivanpahsolar.com/about visited on 01/20/2014).

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If all the solar heliostats are focused on the solar tower the beams multiply the strength of sunlight by 5000 times, and this generates temperatures at the solar tower in excess of 3600° Fahrenheit (> 1982° Celsius). Since steel melts at 2750° Fahrenheit (1510° Celsius), only a percentage of heliostats are focused on the solar receiver so that) the optimal temperature at the tower is approximately 900° Fahrenheit (~482° Celsius) ("How do they do it" Wag TV for Discovery Channel, Season 3, Episode 15, "Design Airplane Parachutes, Create Solar Power, Make Sunglasses" Aired August 25, 2009).



Figure 8: Seville solar power facility (http://inhabitat.com/sevilles-solar-power-tower)

A solar steam plant in Coalinga that also uses heliostat technology for extracting oil is on record stating that the steam generator is set to about 500° Celsius.

(http://abclocal.go.com/kDSn/story?section=news%2Fbusiness&id=8377469 Viewed Jan 21, 2013)

Temperatures measured by the authors at the edge of the solar complex on the surface of a heliostat were approximately 200° Fahrenheit (~93° Celsius). Therefore, there is a gradient of temperature from the edge of the solar field to the tower that ranges from 200° to 900° Fahrenheit.

There is a phenomenon that occurs when the heliostats are focused on the tower and electricity is being generated. The phenomenon can be described as either a circle of clouds around the tower or, at times, a cloud formed on the side that is receiving the solar reflection. It appears as though the tower is creating clouds. Currently we propose two hypotheses of why this "cloud" is formed. The first hypothesis is simply the presumption that the high heat associated with towers is condensing the air, and forming the



Figure 9: Tower 1 (bright white) is shown under power. Tower 2 (black) is not operating.

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clouds. The second hypothesis is that this phenomenon does not represent clouds at all rather it is a place in space where the heliostats that are not being used to generate heat are focused. Under this scenario, it is a place where the mirrors focus the excess energy not being used to generate electricity.

Ivanpah employees and OLE staff noticed that close to the periphery of the tower and within the reflected solar field area, streams of smoke rise when an object crosses the solar flux fields aimed at the tower. Ivanpah employees used the term "streamers" to characterize this occurrence.

When OLE staff visited the Ivanpah Solar plant, we observed many streamer events. It is claimed that these events represent the combustion of loose debris, or insects. Although some of the events are likely that, there were instances in which the amount of smoke produced by the ignition could only be explained by a larger flammable biomass such as a bird. Indeed OLE staff observed birds entering the solar flux and igniting, consequently becoming a streamer.

OLE staff observed an average of one streamer event every two minutes. It appeared that the streamer events occurred more frequently within the "cloud" area adjacent to the tower. Therefore we hypothesize that the "cloud" has a very high temperature that is igniting all material that traverses its field. One possible explanation of this this phenomenon is that the "cloud" is a convergent location where heliostats are "parked" when not in use. Conversely it undermines the condensation hypothesis, given that birds flying through condensation clouds will not spontaneously ignite.

Temperatures required to burn feathers

Many of the carcasses recovered from the Ivanpah Solar plant after the plant became operational showed singing of feathers as shown in Figure 10.



Figure 10: Singed feathers from a Northern Roughwinged Swallow

In order to investigate at what temperature feathers burn/singe, we exposed feathers to different air temperatures. Each feather was exposed to a stream of helium and air for 30 seconds. The results indicate that at 400° Celsius (752° Fahrenheit) after 30 seconds the feather begins to degrade. But at 450° and

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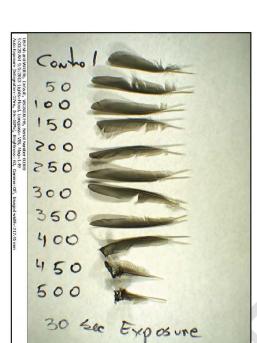


Figure 11: Results of exposing feathers to different temperatures (in degrees Celsius)

500° Celsius (842° and 932° Fahrenheit respectively) the feathers singed as soon as they made contact with the superheated air (Figure 11). Therefore, when singed birds are found, it can be inferred that the temperatures in the solar flux at the time a bird flew through it was at least 400° Celsius (752° Fahrenheit). This inference is consistent with the desired operating temperature of a power tower solar boiler (482° Celsius).

The fact that a bird will catch on fire as it flies through the solar flux has been confirmed by a Chevron engineer who works at the Coalinga Chevron Steam plant, a joint venture of Chevron and BrightSource Solar.

(http://abclocal.go.com/kDSn/story?section=news%2Fbusiness&id=8377469 Viewed Jan 21, 2013)

Conclusions and Recommendations

In summary, three main causes of avian mortality were identified at these facilities; impact trauma, predation and solar flux. Birds at all three types of solar plants were susceptible to impact trauma and predators. Solar flux injury was unique to the power tower facility. Solar facilities, in general, do not appear to attract particular species, rather an ecological variety of birds are vulnerable. That said, certain mortality and species trends were evident, such as waterbirds at Desert Sunlight, where open water sources were present.

Specific hazards were identified, including vertically-oriented mirrors or other smooth reflective panels; water-like reflective or polarizing panels; actively fluxing towers; open bodies of water; aggregations of insects that attracted insectivorous birds; and resident predators. Making towers, ponds and panels less attractive or accessible to birds may mitigate deaths. Specific actions include placing perch-guards on power tower railings near the flux field, properly netting or otherwise covering ponds, tilting heliostat mirrors during washing and suspending power tower operation at peak migration times.

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Visual cues should be retrofitted to existing panels and incorporated into new panel design. These cues may include UV-reflective or solid, contrasting bands spaced no further than 28 cm from each other. This arrangement has been shown to significantly reduce the number of passerines hitting expanses of windows on commercial buildings. Spacing of 10 cm eliminates window strikes altogether. Further exploration of panel design and orientation should be undertaken with researchers experienced in the field (Daneil Klem Jr. of Muhlenberg College) to determine causes for the high rate of impact trauma, and designs optimized to reduce these mortalities.

Challenges to data collection included rapid degradation of carcass quality hindering cause of death and species determination; large facilities which are difficult to efficiently search for carcasses; vegetation and panels obscuring ground visibility; carcass loss due to scavenging; and inconsistent documentation of carcass history. Searcher efficiency has been shown to have varying influences on carcass recovery with anywhere from 30% to 90% detection of small birds achieved in studies done at wind plants (Erickson et al., 2005). Scavengers may also remove substantial numbers of carcasses. In studies done on agricultural fields, up to 90% of small bird carcasses were lost within 24 hours (Balcomb, 1986; Wobeser and Wobeser, 1992). OLE staff observed apparently resident ravens at the Ivanpah power tower. Ravens are efficient scavengers, and could remove large numbers of small bird carcasses from the tower vicinity. (Erickson, W. P., G. D. Johnson, and D. P. Young, Jr., 2005, A summary and comparison of bird mortality from anthropogenic causes with an emphasis on collisions: U S Forest Service General Technical Report PSW, v. 191, p. 1029-1042; Balcomb, R., 1986, Songbird carcasses disappear rapidly from agricultural fields: Auk, v. 103, p. 817-820; Wobeser, G., and A. G. Wobeser, 1992, Carcass disappearance and estimation of mortality in a simulated die-off of small birds: Journal of Wildlife Diseases, v. 28, p. 548-554.)

Given these variables it is difficult to know the true scope of avian mortality at these facilities. The numbers of dead birds are likely underrepresented, perhaps vastly so. Observational and statistical studies to account for carcass loss may help us to gain a better sense of how many birds are being killed. Complete histories would help us to identify factors (such as vertical placement of mirrors) leading to mortalities. Continued monitoring is also advised as these facilities transition from construction to full operation. Of especial concern is the Ivanpah facility which was not fully-functioning at the time of the latest carcass submissions. In fact, all but 7 of the carcasses with solar flux injury and reported dates of collection were found at or prior to the USFWS site visit (October 21-24, 2013) and, therefore, represent flux mortality from a facility operating at only 33% capacity. Investigation into bat and insect mortalities at the power tower site should also be pursued.

ACKNOWLEDGMENTS

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Appendix 1. List of all 71 species recovered from the three solar energy sites. In this table, remains of closely related taxa that could not be definitively identified (e.g. Cinnamon/Blue-winged Teal and Black-throated/Sage Sparrow) are assigned to the biogeographically more likely taxon. In all such cases, the possible taxa are ecologically similar. All of these species are MBTA-listed.

SPECIES		Zone	Residency	Sites	MNI
Cinnamon Teal	Anas cyanoptera	water	migrant	DS,IV	5
Pied-billed Grebe	Podilymbus podiceps	water	migrant	DS	1
Western Grebe	Aechmorphorus occidentalis	water	migrant	DS	9
Eared Grebe	Podiceps nigricollis	water	migrant	DS,GN	5
Brown Pelican	Pelecanus occidentalis	water	migrant	DS	2
Double-crested Cormorant Phalacrocorax auritus		water	migrant	DS	2
Great Blue Heron	Ardea herodias	water	migrant	GN	1
Black-crowned Night- Heron	Nycticorax nycticorax	water	migrant	DS	1
Cooper's Hawk	Accipiter cooperii	air	migrant	IV	1
Red-shouldered Hawk	Buteo lineatus	terr	migrant	IV	1
American Kestrel	Falco sparverius	air	resident	GN,IV	2
Peregrine Falcon	Falco peregrinus	air	resident	IV	1
American Coot	Fulica americana	water	migrant	DS, IV	12
Yuma Clapper Rail	Rallus longirostris yumanensis	water	resident	DS	1
Sora	Porzana carolina	water	migrant	DS,IV	2
American Avocet	Recurvirostra americana	water	migrant	DS	1
Spotted Sandpiper	Actitis maculatus	water	migrant	IV	2
Ring-billed Gull	Larus delawarensis	water	migrant	GN	2
California Gull	Larus californianus	water	resident	GN	1
Greater Roadrunner	Geococcyx californianus	terr	resident	IV	5
Yellow-billed Cuckoo	Coccyzus americanus	terr	migrant	IV	1
Mourning Dove	Zenaida macroura	terr	resident	DS, IV	14
White-winged Dove	Zenaida asiatica	terr	resident	DS,GN	2
Barn Owl	Tyto alba	terr	resident	IV	1
Lesser nighthawk	Chordeiles acutipennis	air	resident	DS,GN,IV	7
Common Poorwill	Phalaenoptilus nuttallii	air	resident	DS,IV	2
White-throated Swift	Aeronautes saxatalis	air	resident	IV	1
Costa's Hummingbird	Calypte costae	air	resident	DS	1
Allen's/Rufous Hummingbird	Selasphorus sp.	air	migrant	IV	1
Northern Flicker	Colaptes auratus	terr	resident	IV	1
Ash-throated Flycatcher	Myiarchus cinerascens	air	resident	DS,IV	2
Say's Phoebe	Sayornis saya	air	resident	GN	2
Black Phoebe	Sayornis nigricollis	air	resident	DS	1
Loggerhead shrike	Lanius ludovicianus	terr	resident	DS,IV	5
Warbling Vireo	Vireo gilvus	terr	migrant	IV	1
Common Raven	Corvus corax	terr	resident	DS,IV	3
Horned Lark	Eremophila alpestris	terr	migrant	DS	1
Tree Swallow	Tachycineta bicolor	air	migrant	DS,GN,IV	5

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SPECIES		Zone	Residency	Sites	MNI
Cliff Swallow	Petrochelidon pyrrhonota	air	resident	GN	5
No. Rough-winged Swallow	Stelgidopteryx serripennis	air	migrant	IV	2
Verdin	Auriparus flaviceps	terr	resident	IV	3
Blue-gray Gnatcatcher Polioptila caerulea		terr	resident	IV	1
Northern Mockingbird	Mimus polyglottos	terr	resident	IV	1
American Pipit	Anthus rubescens	terr	migrant	IV	4
Orange-crowned Warbler	Oreothlypis celata	terr	migrant	IV	1
Lucy's Warbler	Oreothlypis luciae	terr	resident	IV	1
Yellow-rumped Warbler	Setophaga coronata	air	migrant	IV	14
Black-throated Gray Warbler	Setophaga nigrescens	terr	migrant	IV	1
Hermit Warbler	Setophaga occidentalis	terr	migrant	GN	1
Townsend's warbler	Setophaga townsendi	terr	migrant	DS.IV	4
Yellow Warbler	Setophaga petechia	terr	migrant	IV	1
Black-and-white Warbler	Mniotilta varia	terr	migrant	IV	1
MacGillivrav's Warbler	Oporornis tolmei	terr	migrant	IV	1
Wilson's Warbler	Cardellina pusilla	terr	migrant	DS,IV	4
Common Yellowthroat	Geothlypis trichas	terr	migrant	DS	1.
Western Tanager	Piranga ludoviciana	terr	migrant	DS,IV	4
Black-headed Grosbeak	Pheucticus melanocephalus	terr	migrant	DS,GN	2
Lazuli Bunting	Passerina caerulea	terr	migrant	IV	1
Blue Grosbeak	Passerina caerulea	terr	resident	IV	1
Green-tailed Towhee	Pipilo chlorurus	terr	migrant	IV	1
Brewer's Sparrow	Spizella breweri	terr	resident	IV	3
Chipping Sparrow	Spizella passerina	terr	resident	GN,IV	4
Black-throated Sparrow	Amphispiza bilineata	terr	resident	DS.IV	4
Savannah Sparrow	Passerculus sandwichensis	terr	migrant	DS,IV	3
White-crowned Sparrow	Zonotrichia leucophrys	terr	migrant	IV	6
Pine Siskin	Spinus pinus	terr	migrant	IV	1
House Finch	Carpodacus mexicanus	terr	resident	IV	13
Great-tailed Grackle	Quiscalus mexicanus	terr	resident	DS,IV	5
Brown-headed Cowbird	Molothrus ater	terr	resident	DS,GN,IV	8
Yellow-headed Blackbird	Xanthocephalus xanthocephalus	terr	migrant	DS	1
Bullock's Oriole	Icterus bullockii	terr	resident	GN	2

Species recovered from one site: 47 two sites: 18 three sites: 5

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Appendix 2. Species with solar flux burns

Camaran Nama	C-iiE	
Common Name	Scientific name	
Yellow-rumped warbler	Setophaga coronata	12
House finch	Carpodacus mexicanus	10
Chipping sparrow	Spizella passerina	2
Unidentified warbler	Parulidae	2
Verdin	Auriparus flaviceps	2
Great-tailed grackle	Quiscalus mexicanus	2
Lucy's warbler	Oreothlypis luciae	1
Wilson's warbler	Cardellina pusilla	1
MacGillivray's warbler	Oporornis tolmei	1
Black-throated gray warbler	Setophaga nigrescens	1
Townsend's warbler	Setophaga townsendi	1
Orange-crowned warbler	Oreothlypis celata	1
Blue-gray gnatcatcher	Polioptila caerulea	1
Unidentified swallow	Hirundinidae	1
Northern rough-winged swallow	Stelgidopteryx serripennis	1
Warbling vireo	Vireo gilvus	1
Unidentified hummingbird	Selasphorus sp.	1
Unidentified passerine	Passeriformes	1
Unidentified finch	Carpodacus sp.	1
Lazuli bunting	Passerina caerulea	1
Unidentified sparrow	Spizella species	1
Unidentified blackbird	Icteridae	1
Peregrine falcon	Falco peregrinus	1

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EXHIBIT 5

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A preliminary assessment of avian mortality at utility-scale solar energy facilities in the United States



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Impact assessment

ABSTRACT

Despite the benefits of reduced toxic and carbon emissions and a perpetual energy resource, there is potential for negative environmental impacts resulting from utility-scale solar energy (USSE) development. Although USSE development may represent an avian mortality source, there is little knowledge regarding the magnitude of these impacts in the context of other avian mortality sources. In this study we present a first assessment of avian mortality at USSE facilities through a synthesis of available avian monitoring and mortality information at existing USSE facilities. Using this information, we contextualize USSE avian mortality relative to other forms of avian mortality at 2 spatial scales: a regional scale (confined to southern California) and a national scale. Systematic avian mortality information was available for three USSE facilities in the southern California region. We estimated annual USSE-related avian mortality to be between 16,200 and 59,400 birds in the southern California region, which was extrapolated to between 37,800 and 138,600 birds for all USSE facilities across the United States that are either installed or under construction. We also discuss issues related to avian—solar interactions that should be addressed in future research and monitoring programs.

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1. Introduction

Renewable energy development has been increasing as an alternative to fossil-fuel based technologies, in large part to reduce toxic air emissions and CO2-induced effects on climate [1,2]. According to the U.S. Energy Information Association [3], electric generation from renewables in the United States has increased by over 50% since 2004 and renewable energy sources currently provide approximately 14% of the nation's electricity. Solar energy-based technologies represent a rapidly developing renewable energy sector that has seen exponential growth in recent years [4,5]. For example, since 2013 alone, cumulative installations of photovoltaic (PV) solar energy technologies, including residential, commercial, and utility-scale installations, have more than doubled in the United States [6].

Utility-scale solar energy (USSE) projects generate electricity for delivery via the electric transmission grid and sale in the utility market. This differs from distributed solar energy systems which are designed for electric generation and utilization at local scales. According to the Solar Energy Industries Association (SEIA) [7], there currently are approximately 800 USSE projects (>1 MW [MW]) in the United States that are either in operations or under construction, representing approximately 14 GW (GW) of electric capacity. Based on solar insolation models developed by the National Renewable Energy Laboratory [8], the greatest solar resource potential in the United States occurs in the southwest within the six following states: Colorado, New Mexico, Utah, Arizona, Nevada, and California (Fig. 1). Indeed, most of the installed or planned utility-scale solar facilities in the United States (based on electric capacity and includes projects that are operating, under construction, and under development) are located within these six southwestern states (Fig. 2) [7].

There are two basic types of solar energy technologies employed at USSE installations in the United States [9]: photovoltaic (PV) and concentrating solar power (CSP). Photovoltaic systems use cells to convert sunlight to electric current, whereas CSP systems use reflective surfaces to concentrate sunlight to heat a receiver. That heat is subsequently converted to electricity using a thermoelectric power cycle. CSP systems typically include power tower systems

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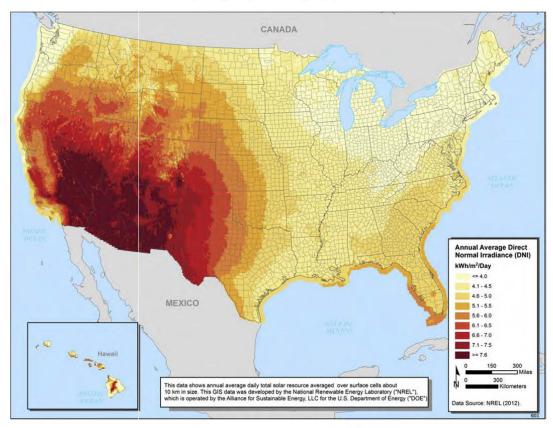


Fig. 1. Solar energy potential in the United States [8].

with heliostats (angled mirrors) and parabolic trough systems (parabolic mirrors). In the United States, most of the electricity produced by utility-scale solar energy projects through 2015 was generated using PV technologies [6].

Despite the benefits of reduced toxic and carbon emissions from a perpetual energy resource, there is potential for negative environmental impacts resulting from utility-scale solar development [9,10]. Utility-scale solar energy facilities in the United States require large spatial footprints (between 1.4 and 6.2 ha of land per MW of electric production) and are projected to require a total of 370,000 1,100,000 ha of land by 2030, mostly in the arid regions of the southwestern states [11]. These large scale developments and land-cover change associated with them may result in a variety of environmental impacts. Among the potential environmental impacts are ecological impacts to wildlife species and their habitats. Recent studies have suggested that utility-scale solar developments may represent a source of mortality for wildlife such as birds [12]. There are currently 2 known types of direct solar energy-related bird mortality [9,12,13]:

 Collision-related mortality mortality resulting from the direct contact of the bird with a solar project structure(s). This type of mortality has been documented at solar projects of all technology types. 2. Solar flux-related mortality mortality resulting from the burning/singeing effects of exposure to concentrated sunlight. Mortality may result in several ways: (a) direct mortality; (b) singeing of flight feathers that cause loss of flight ability, leading to impact with other objects; or (c) impairment of flight capability to reduce the ability to forage or avoid predators, resulting in starvation or predation of the individual [12]. Solar flux-related mortality has been observed only at facilities employing power tower technologies.

The nature and magnitude of impacts to bird populations and communities is generally related to the following three primary project-specific factors [10,14]: location, size, and technology. Bird abundance and activity at local and regional scales varies by the distribution of habitat and other landscape features (e.g., elevation) in the environment [15 19]. Therefore, the location of a solar energy project relative to bird habitats, such as migration flyways, wetlands, and riparian vegetation, could influence avian mortality risk. The footprint size of the solar project is a direct measure of the amount of surface disturbance and human activity. Projects with larger footprints, therefore, may result in more avian fatalities than projects with smaller footprints. Lastly, different solar technologies and project designs may influence avian mortality risk. For example, project designs that utilize constructed cooling ponds, or

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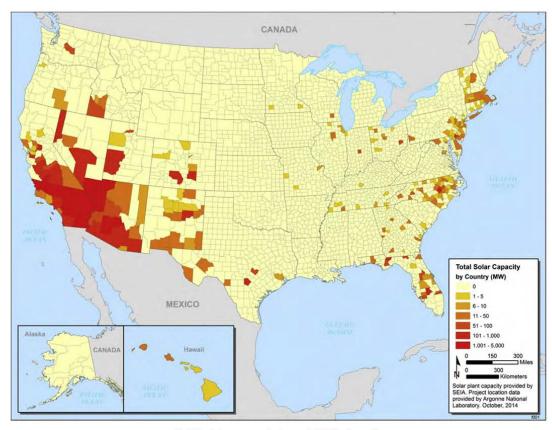


Fig. 2. Total solar energy production capacity (MW) by County [7].

solar collectors that reflect polarized sunlight in such a way so as to be perceived as waterbodies, may attract birds and their prey (e.g., insects), thereby increasing the risk of bird collisions with project structures [10,12,14,20]. To date, however, no empirical research has been conducted to evaluate the attraction of utility-scale solar facilities to migrating or foraging birds. Although collision-related impacts may occur at all types of solar energy technologies, the effects of solar flux on birds to date have been observed only at facilities employing power tower technologies [9,12,13].

One approach to understanding the impacts of utility-scale solar energy development on birds is through understanding mortality risk from solar energy development in the context of other industrial developments. Techniques to estimate avian mortality based on systematic monitoring methods have been previously employed for other sources of avian mortality (e.g., [21 24]). Despite the potential for avian mortality from solar energy development, however, there is currently little empirical data on avian mortality at solar facilities (but see McCrary et al. [13]). However, as more data resulting from avian monitoring at solar energy facilities become available, a systematic assessment of available data can provide a better understanding of avian fatality risk at utility-scale solar energy developments.

The objectives of this study were to 1) synthesize currently-available information regarding avian mortality at utility-scale solar facilities; 2) contextualize avian mortality at utility-scale solar facilities relative to other human sources of avian mortality; and 3) discuss issues related to avian solar interactions that need to be addressed in future research and monitoring designs.

2. Methods

2.1. Study area

Despite efforts to collect avian solar data at USSE facilities throughout the United States (see RESULTS), our comprehensive search for available avian fatality information at USSE facilities revealed that information was primarily only available within the region of southern California. For this reason, we defined our study area as the area that encompassed approximately 148,000 km² within the 10 southern-most counties of California (Fig. 3). This region was chosen for the amount of current and planned utility-scale solar energy development and availability of project-specific information on avian fatalities. Nearly 50% of utility-scale solar developments either under construction or in operation in the



Fig. 3. Utility-scale solar facilities with available avian fatality data and major wind projects within the Southern California study area.

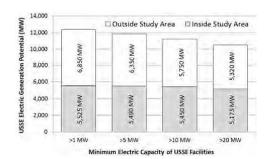


Fig. 4. Utility-Scale Solar Energy (USSE) electric generation potential in the Southern California Study Area and within the United States by minimum name plate electric capacity category.

United States are located in this region (Figs. 2 and 4) [7]. In addition, all currently-available information on avian mortality at U.S. utility-scale solar energy facilities are associated with only those projects occurring in this region (see Results).

2.2. Literature review

We conducted a review of available information on avian monitoring and mortality at utility-scale solar energy facilities by obtaining project-specific information from publicly-available on-line sources, such as the California Energy Commission (CEC; http://www.energy.ca.gov/). We conducted a comprehensive online search of the open literature on Web of Science (https://webofknowledge.com/) and Google Scholar (http://scholar.google.com/) using search terms "solar energy" and a combination of bird", "deaths", "fatality", "mortality", "monitoring", "avian mortality", and "avian monitoring". We also contacted and requested avian mortality information from solar energy developers and

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industry representatives operating in the United States and internationally.

Only studies at solar facilities in which avian fatalities were recorded from systematic surveys were considered in this study. Systematic data include fatalities observed during the course of survey efforts designed to characterize avian mortality at the project. Other fatality observations, such as incidental fatality data, were not part of focused systematic searches for carcasses and therefore could not be used to estimate project-specific mortality rates.

2.3. Mortality rate estimation

A standard metric commonly used for assessing avian mortality at energy production facilities is the mortality rate estimated as the total number of bird deaths per unit of energy production (e.g., bird deaths per MW per year) [24,25]. Our primary focus was to standardize avian mortality rates to the name plate capacity of utility energy developments to enable more direct comparison to other energy-related mortality sources such as wind energy. However, we also calculated mortality rates by the amount of electricity produced at each facility assuming a 30% capacity factor (the approximate capacity factor observed during the first year of operations at the Ivanpah Solar Electric Generating System). Using these metrics, a regional avian mortality rate was estimated for utility-scale solar projects in the study area (Fig. 3).

It is important that mortality estimates be adjusted to account for biases in scavenging and ability of searchers to detect carcasses [28-30]. Searcher efficiency is a metric to quantify the ability of searchers to detect carcasses. It typically refers to the percentage of carcasses observed by searchers relative to a known number of carcasses. Factors such as bird size and the presence of obstructions such as vegetation and structures may influence searcher efficiency [28,30]. The carcass persistence rate is a metric to quantify the amount of time (usually days) that a carcass is available to be observed before it is scavenged by predators. Factors such as bird size and local predator densities may influence carcass persistence estimates [28-30]. We ensured that all studies used in avian mortality rate estimates included mathematical approaches to account for predation and searcher efficiency biases (e.g., [30,31]. For those studies that did not consider predation and searcher efficiency biases in mortality rate estimation, we applied adjustments for those biases based on average predation and searcher efficiency rates observed at nearby solar and wind energy projects in the region (see supplemental information).

Avian mortality at some USSE facilities was recorded as separate mortality rates for fatalities known to be attributable to the facility (e.g., observable collision trauma or singed feathers) and unknown fatalities in which carcasses found on the project site showed no observable project-associated cause of death. The total avian mortality rate was calculated as a range representing the minimum (based on carcasses with a known cause of death attributable to the facility) and the maximum (based on the sum of birds with known and unknown causes of death). It is important to identify and distinguish between these two types of mortality estimates because birds with an unknown cause of death may have died due to natural causes (i.e., predation or disease) and may not be attributed to the solar facility. Following this, we used information provided by SEIA [7] to determine the total name plate electric capacity of all current and planned USSE facilities in the study region. We multiplied total USSE electric capacity with estimated USSE mortality rates to calculate total annual USSE-related avian mortality. We also used the regional USSE mortality rate to estimate USSE-related avian mortality across all USSE facilities that were in operations or under construction in the United States [7]. We used

the regional USSE mortality rate to extrapolate USSE-related mortalities at a national scale because USSE developments in the southern California study region represented nearly 50% of all USSE developments in the United States (Fig. 4).

2.4. Contextualizing solar avian mortality

To our knowledge, this study is the first systematic synthesis of avian mortality at USSE facilities. There are no previous efforts to systematically contextualize solar-avian mortalities to other avian mortality sources. There have been several efforts to assess avian mortality associated with other renewable energy developments such as wind energy [23,24] and non-energy sources such as road mortality [32], collisions with buildings and other structures such as communication towers [21,32-34], and cat predation [35]. We reviewed these avian monitoring and mortality studies to estimate mortality rates from energy and non-energy sources that could be comparable to USSE-related mortalities. The mortality sources chosen for comparison include (1) wind energy development, (2) fossil fuel energy development, (3) collisions with communication towers, (4) road mortality, and (5) building collisions. We used mortality rate estimates from these sources to contextualize avian mortality at two geographic scales: within the southern California study region and across the United States.

2.4.1. Wind energy development

Recent assessments of avian mortality at wind energy facilities across the United States have been reported by Loss et al. [36] and Smallwood et al. [23]. To assess avian mortality associated with wind energy developments in the southern California study region, the locations of wind energy facilities and associated electric generation capacity within the study region were obtained using turbine locations mapped by the U.S. Geological Survey (USGS) through July 2013 [37]. We searched available literature for systematic avian monitoring and mortality studies that provided statistically-based adjusted mortality estimates at these wind energy facilities in the region. Using these studies, we calculated a capacity-weighted average mortality rate (number of birds/MW/ year) across the wind energy projects in the region and determined the total electric energy production of the mapped wind energy facilities in the region to estimate total annual avian mortality associated with wind energy developments in the southern California region. We used estimates provided by Loss et al. [36] and Smallwood [23] to estimate avian mortalities at wind facilities across the United States.

2.4.2. Fossil fuel energy development

Sovacool [25] estimated avian mortality from fossil fuel power plants across the United States as a result of collision with infrastructure, electrocutions, pollution and contamination, and climate change. In addition, Sovacool [25] estimated climate change-induced avian mortality (in terms of habitat loss and changes in migration) predicted to be the result of fossil fuel power plant operations. We obtained data on the number and electric capacity of fossil fuel power plants in the southern California region from the California Energy Commission Almanac of Power Plants (http://energyalmanac.ca.gov/powerplants/). We applied the fossil fuel mortality estimate from Sovacool [25] to calculate a regional annual mortality estimate resulting from fossil fuel power plants. We also used the mortalities calculated by Sovacool [25] as an estimate of avian mortalities associated with fossil fuel power plants across the United States.

2.4.3. Collisions with communication towers

Longcore et al. [33] conducted a systematic review of avian

mortality at communication towers in an effort to estimate avian mortality resulting from collisions with communication towers and associated structures (e.g., guy wires) across North America. Mortality estimates were calculated within Bird Conservation Regions (BCR) and aggregated to represent an overall mortality estimate across North America. Longcore et al. [33] estimated over 6 million bird mortalities resulting from collisions with communication towers across North America. To estimate annual avian mortality associated with collisions with communication towers in the study region, we applied the mortality estimates within the BCRs reported by Longcore et al. [33] proportional to the distribution of BCRs in this study's region.

2.4.4. Road mortality

The avian impacts of roadways, including direct collision mortality and indirect effects such as habitat fragmentation, have been a concern among scientists for many years [32,38,39]. Knowledge about avian fatality estimates associated with roadways in the United States comes from the works of Banks [40] and Erickson et al. [32]. In a synthesis of existing fatality information, Banks [40] found that avian mortality along roadways in the United States ranged from 2.7 to 96.2 bird deaths per mile of roadway (4.3-153.9 bird deaths per km). Based on an analysis of all roadways in the United States, Erickson et al. [32] estimated total avian mortality associated with vehicle traffic along roadways in the United States between 89 million and 340 million birds per year. In a more recent study in Canada, Bishop and Brogan [41], found that, after accounting for scavenging, total estimated road mortality was 21.6 bird deaths per mile of roadway (34.6 bird deaths per km). We obtained roadway GIS data from the U.S. Census Bureau [42] to estimate the amount of paved roadways in the study region. We used this estimate to calculate avian road mortality within the range of mortality rates reported by Banks [40] and Bishop and Brogan [41].

2.4.5. Building collisions

Loss et al. [34] provided a systematic review and estimate of avian mortality associated with building collisions in the United States. Reviewing published literature and unpublished data, Loss et al. [34] estimated avian mortality at buildings of three different classes: residential structures, low-rise buildings (1-3 stories high), and high-rise buildings (≥4 stories tall). Estimated mortality in each building class was calculated by multiplying data-derived mortality probabilities by the estimated number of buildings in the United States. Based on this approach, Loss et al. [34] calculated annual bird mortality at building structures across the United States to be between 365 million and 988 million birds. For purposes of establishing context in this study, avian mortality at buildings was only calculated for residences in the study region because information on residential structures were readily available from the U.S. Census Bureau housing unit statistics [43] and information provided by individual county assessor's offices. The calculation of avian mortalities resulting from collisions with residential structures, therefore, represents a minimum building collision mortality estimate for the region and is used solely for contextualization purposes. Loss et al. [34] calculated the 95% CI of annual bird mortality at residences to be between 1.3 and 3.1 birds per residence across the United States (median: 2.1 birds). We obtained data on the number of residential structures within the southern California region from the U.S. Census Bureau American Housing Survey [43] and individual county assessor's offices and applied the building collision-related mortality estimates provided by Loss et al. [34] to calculate a regional annual mortality estimate resulting from bird collisions with residential structures.

3. Results

3.1. Avian mortality at USSE facilities

A summary of all USSE facilities in the United States with available avian monitoring and mortality information is provided in the Supplemental Information. We identified 3 USSE facilities in the United States at which avian fatality data have been systematically collected and suitable for mortality rate estimation (Table 1). These three USSE facilities occur in the southern California study region: California Solar One (CSO), California Valley Solar Ranch (CVSR), and Ivanpah Solar Electric Generating System (ISEGS) (Fig. 3). The CSO facility was a CSP power tower project with a name plate electrical capacity of 10 MW that was decommissioned in 1987. Systematic surveys on CSO's 7.3 ha (18 acre) project area were conducted over the course of one year between 1982 and 1983 by McCrary et al. [13]. These survey results were used to calculate a site-wide avian mortality estimate for the facility (see Supplemental Information for more details on avian mortality estimation). The CVSR facility is an operational PV project with a name plate electrical capacity of 250 MW. Annual systematic surveys on CVSR's 1902 ha (4700 acre) project area were used to calculate site-wide avian mortality estimates [44]. The ISEGS facility is an operational CSP power tower project with a name plate electrical capacity of 377 MW. Annual systematic surveys on ISEG's 1457 ha (3600 acre) project area were used to calculate site-wide avian mortality estimates [45].

Avian mortality estimates at each of the three USSE facilities were adjusted to account for scavenger and searcher efficiency biases. These adjustments were included in the mortality estimates determined for CVSR and ISEGS [44,45]. However, McCrary et al. [13] did not present an adjusted mortality rate for CSO. To calculate an adjusted mortality rate for CSO, we used average estimates of carcass persistence and searcher efficiency from nearby studies using the formula developed by Shoenfeld [31]. In addition, separate mortality rates were calculated at CVSR and ISEGS for those carcasses with a cause of death that could be attributed to known site-related factors (e.g., collision trauma) as well as those carcasses found on site that did not show observable site-related causes of death [44,45]. These separate estimates were used to compute the total potential site-wide mortality rate (which is the sum of the known and unknown mortality rates). At CSO, McCrary et al. [13] attributed 100% of the fatalities to a project-related cause of death. At the CSO facility; therefore, the mortality rate for carcasses with unknown causes of death was assumed to be zero (Table 1). See the Supplemental Information for more information on data collection and mortality rate estimation at each of these facilities.

There was considerable variability in mortality rates for carcasses with known project-related causes of death at USSE facilities (ranging between 0.50 and 10.24 birds/MW/year) (0.23 and 3.90 birds/GWh/year) (Table 1). However, incorporating mortality of carcasses with no observable project-related cause of death resulted in less variable total potential mortality rates across USSE facilities (ranging between 9.30 and 10.70 birds/MW/year) (3.55 and 4.08 birds/GWh/year). Calculating the capacity-weighted average mortality rate of known USSE-related mortalities and total potential mortality rate results in a range of 2.7-9.9 birds/MW/year (1.06-3.78 birds/GWh/year) (Table 1). This range represents the uncertainty in including fatalities with no observable USSE-related cause of death to the total mortality estimate. Presumably, some carcasses found on site that showed no signs of USSE-attributable cause of death would actually be associated with other causes (e.g., natural background mortality, predation, disease, etc.). Based on SEIA [7], there is a total name plate electric capacity of 6 GW for current and planned USSE facilities in the study region. Applying

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Table 1
Avian mortality estimates from systematic surveys at utility-scale solar energy (USSE) facilities.

Project name	Technology type and MW (in Parentheses) ^a	Mortality rate for known USSE-related fatalities ^b	Mortality rate for unknown USSE-related fatalities ^c	Total mortality rate for known and unknown USSE-related fatalities ^d	Source of mortality estimate ^e
California Solar One	CSP – Power tower (10)	10.24 (3.90)	0 (0)	10.24 (3.90)	McCrary et al. [13]; See also Supplemental Information
California Valley Solar Ranch	PV (250)	0.50 (0.23)	10.20 (3.89)	10.70 (4.08)	H.T. Harvey & Associates [44]
Ivanpah	CSP – Power tower (377)	3.96 (1.53)	5.34 (2.05)	9.30 (3.55)	H.T. Harvey & Associates [45]
Capacity-weigh rate (birds/M	ted average mortality (W/year)	2.7 (1.06)	7.3 (2.79)	9.9 (3.78)	

a CSP = Concentrating Solar Power; PV = Photovoltaic.

the range of USSE capacity-weighted average mortality rates to the total USSE electric generation potential for the region, we estimate between 16,200 and 59,400 avian fatalities per year from USSE facilities within the southern California study region. Across all USSE facilities in operation or under construction in the United States (approximately 14 GW name plate electric capacity), between 37,800 and 138,600 bird deaths are estimated each year associated with USSE developments (Table 2).

3.2. Contextualizing avian mortality to other sources

Based on turbine locations mapped by the USGS through July 2013 [37], we calculated 4402 MW of total electric energy production of wind energy facilities in the study region. Of the wind energy facilities known to occur in the region, avian mortality data were available for 5 facilities (Table 3). These projects contain a wide range of avian mortality estimates (0.55–38.62 mortalities/MW), most likely due to changes in turbine technology over time. Taking a capacity-weighted average mortality rate across projects in the region results in an estimate of 6.71 bird deaths/MW/year. In addition, based on Smallwood's [23] national mortality estimate of 573,093 birds across a total installed wind energy capacity of 51,630 MW in the United States (as of 2012), we estimated a national avian mortality rate of 11.10 birds/MW. Applying this range of annual wind-related mortality rates (6.71–11.10 birds/MW) to the

total electric generation potential for wind energy facilities in the study region results in an estimate of 29,537–48,862 bird mortalities per year among wind energy facilities in the region (Table 2).

Sovacool [25] estimated approximately 14.5 million birds die annually across the United States as a result of fossil fuel power plant operations, at a rate of approximately 74.2 birds/MW/year of nameplate electrical generation. Based on information obtained from the California Energy Commission, the total electric capacity rating of fossil fuel power plants in the study region was approximately 48,000 MW. Combining this electricity production capacity with the fossil fuel mortality estimate from Sovacool [25] (74.2 birds/MW/year) results in a regional mortality estimate of 3,561,600 birds associated with fossil fuel power plants (Table 2).

The following BCRs occur in the study region [33]: Sonoran and Mojave Deserts (57%), Coastal California (42%), and Sierra Nevada (1%). Based on avian mortality estimates from Longcore et al. [33] at communication towers in the United States and adjusting for the percentage of BCRs occurring in the region, we estimated avian mortality resulting from collision with communication towers in the study region to be 70,552 birds per year (Table 2).

Based on roadway GIS data obtained from the U.S. Census Bureau [42], there are approximately 167,700 miles of paved roadways the study region. Banks [40] and Bishop and Brogan [41] estimated avian road mortality to range from 2.7 to 96.2 bird deaths/mile. Multiplying that range by the number of paved miles in the

 Table 2

 Estimated annual avian mortality from various sources in the Southern California Region and United States.

Mortality source	Southern California region	United States
Utility-scale solar energy (USSE) developments	16,200-59,400	37,800-138,600°
Wind energy developments	29,537-48,862	140,000-573,000 ^b
Fossil fuel power plants	3,561,600	14.5 million ^c
Communication towers	70,552	4.5-6.8 million ^d
Roadway vehicles	>453,000°	89-340 million
Buildings and windows	>7,800,0008	365-988 million ^h

- ^a Based on approximately 14 GW total name plate capacity of utility-scale solar facilities in operations or under construction across the United States [7].
- b Sources: Loss et al. [36], Smallwood [23], Erickson et al. [24].
- ^c Source: Sovacool [25].
- d Sources: Erickson et al. (2005), Longcore et al. [33].
- Represents a minimum estimate using only estimated mortality for paved roadways in the southern California study region.
- Source: Loss et al. [49].
- ⁸ Represents a minimum estimate using only estimated mortality for residential structures in the southern California study region.
- h Source: Loss et al. [34].

b Mortality rate for fatalities known to be attributable to the facility (e.g., observable collision trauma or singed feathers). Mortality rate represents the annual number of estimated bird deaths per megawatt of name plate electric capacity. Values in parentheses represent the annual mortality rate estimated by the amount of electricity produced in gigawatt hours (GWh), assuming a 30% capacity factor.

estimated bits death per inegative transfer and a 30% capacity factor.

^c Mortality rate for carcasses found on the project site of unknown cause (e.g., show no observable USSE-associated cause of death). Mortality rate represents the annual number of estimated bird deaths per megawatt of name plate electric capacity. Values in parentheses represent the annual mortality rate estimated by the amount of electricity produced in giarwatt hours. (CWA) assuming a 30% capacity factor.

electricity produced in gigawatt hours (GWh), assuming a 30% capacity factor.

d Total mortality rate includes the mortality rate calculated for carcasses found at USSE facilities with known and unknown causes of death (i.e., sum of known and unknown mortality rates). Mortality rate represents the annual number of estimated bird deaths per megawatt of name plate electric capacity. Values in parentheses represent the annual mortality rate estimated by the amount of electricity produced in gigawatt hours (GWh), assuming a 30% capacity factor.

^e Refer to Supplemental Information for summary of data collection and mortality estimation at each solar energy facility.

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Table 3

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Avian mortality estimates at wind energy facilities within the Southern California study Region².

Project name	Location	Electric generation capacity (MW)	Estimated mortality rate (per MW per year)	Source of mortality estimate
Alite Wind Energy Facility	Kern County, CA	24	0.55	Chatfield et al. [50]
Dillon Wind Energy Facility	Riverside, CA	45	4.71	Chatfield et al. [51]
Tehachapi Wind Resource Area (West Ridge)	Kern County, CA	11.88	38.62	Smallwood [23]
Tehachapi Wind Resource Area (Middle Ridge)	Kern County, CA	19.56	5.67	Smallwood [23]
Tehachapi Wind Resource Area (East Slope)	Kern County, CA	30.24	2.72	Smallwood [23]
Capacity-weighted average mortality rate v	vithin the study	y region	6.71	
Estimated average mortality rate for wind	energy projects	in the United States [23]	11.10 ^b	

a Mortality estimates are based on studies that calculated avian mortality for all birds (e.g., passerines and raptors).

b National estimate calculated by Smallwood [23] based on estimated total mortality of 573,093 birds at installed wind energy capacity of 51,630 MW.

region results in 452,790–16,132,740 bird deaths/year due to road mortality in the study region (Table 2).

Based on data provided by the U.S. Census Bureau American Housing Survey [43] and information provided by each of the county assessor's offices, there are approximately 6,000,000 residential structures in the southern California study region. Applying the residential 95% confidence interval (CI) of the avian mortality estimate calculated by Loss et al. [34] results in an estimated 95% CI of 7,800,000 to 18,200,000 bird fatalities per year in the study region resulting from collisions with residential structures. The lower 95% CI mortality estimate of 10,500,000 birds represents a lower-bound estimate intended only for comparison purposes in this study (Table 2). Additional avian fatalities associated with collision with low-rise and high-rise buildings that were not evaluated in this study would contribute to total avian mortality associated with building collisions in the study area.

4. Discussion

To our knowledge, this is the first systematic assessment and contextualization of avian mortality at USSE facilities in the United States. Like all industrial developments, USSE developments have the potential to impact birds and bird communities in a number of ways, including direct fatality as a result of collision with USSE infrastructure or solar flux-related injuries. The studies reviewed in this article revealed that avian fatalities occur at USSE facilities employing both CSP and PV technologies. Systematic data collection and science-based methodologies to estimate adjusted mortalities to account for bias factors (e.g., predation, searcher efficiency, etc.) are important to understand avian impacts of USSE developments in the context of other human activities. The studies at the three USSE facilities from which systematically-derived avian mortality estimates could be calculated were all located in a region of southern California currently experiencing an accelerated rate of USSE development. According to SEIA [7], this region accounts for nearly 80% of all USSE developments in the state of California and nearly 50% of all USSE developments in the United States (Fig. 3).

Our evaluation of existing avian mortality information at USSE facilities provided a multi-scalar contextualization of USSE-related avian mortality in relation to other human activities at a regional and national scale. At both spatial scales, we found that avian mortalities at USSE facilities were considerably lower than most other human activities (Table 2). Within the southern California study region, avian mortalities at USSE facilities were within the range of mortalities estimated for utility-scale wind energy facilities. Estimated across the United States, however, avian mortality was greater at wind energy facilities, presumably due to the greater

amount of wind energy development in other parts of the country. Total electric capacity of installed wind energy facilities in the United States was nearly 69 GW by the end of 2014 (>48,000 turbines; [46]), as opposed to total electric capacity of installed USSE facilities of approximately 14 GW by the end of 2015 [7].

Although USSE-related avian mortality was estimated to be orders of magnitude less than estimated mortality from other human activities across the United States (except wind energy development: Table 2), the number of avian fatalities at solar facilities may increase in future years as more solar facilities are constructed. The amount of planned future USSE development in the United States is nearly 4 times the current installed electric capacity [7]. Based on the current USSE avian mortality rates examined in this study, full build-out of the nearly 48 GW of potential future USSE developments may account for as many as 480,000 bird deaths annually in the United States. However, avian activity and abundance varies regionally [26,27,47] and may result in regional variation in avian mortality risk to human activities [25,27]. Because of this variation, additional systematic monitoring of avian fatality from various geographic regions where USSE projects are being developed would be needed to better understand overall avian mortality at USSE facilities across the United States.

Our preliminary assessment identified several opportunities to improve consistency in avian monitoring and data collection efforts at existing USSE facilities. For example, not all USSE facilities in the United States operate with an existing avian monitoring and reporting protocol, nor is there consistency in the survey design and reporting among the facilities that do implement such protocols. Only three USSE facilities were reported to have systematic avian fatality information that could be used to estimate projectspecific avian mortality, and all of these facilities were located in southern California. Even among these facilities, there were differences in survey design and analytical approaches. For example, methods to estimate mortality based on carcasses with observable USSE-related cause of death separately from all other carcasses with unknown cause of death were developed at two of the three USSE facilities [44,45]. Moving forward, several data needs and recommendations can be made to improve understanding of avian fatality issues at USSE facilities:

- 1 There is a basic need to better understand the causal factors that contribute to fatalities, such as siting considerations, the potential for avian attraction to USSE facilities (e.g., the "lake effect" hypothesis), and project design (e.g., whether evaporative cooling ponds are used).
- 2 There is a need for more standardized, consistent, and sciencebased avian monitoring protocols to improve comparability of

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- the data being collected. Standardized monitoring methodologies will improve the scientific certainty of conclusions about avian mortality.
- 3 As efforts get under way to improve the quality of avian mortality data collected from USSE facilities, researchers should focus on (a) uncertainties related to avian risks; (b) populationlevel impacts to migratory birds; (c) development of more effective inventory and monitoring techniques; and (d) developing appropriate and cost-effective mitigation measures and best management practices to reduce mortality risk.

While our study provides a preliminary assessment of avian mortality at USSE facilities, it could serve as a reference for future study as more avian monitoring is conducted at USSE facilities. There still remains uncertainty in the population-level impacts of USSE avian mortality. Despite this uncertainty, available information suggests that USSE-related avian mortality is considerably lower than mortality from other human activities. However, USSE facilities may still contribute to the cumulative effects of all avian mortality risk factors (including all other energy developments, vehicle and building collisions, etc.). Additional study is needed to understand the combined influence of all avian mortality risk factors, including USSE-related mortality, on avian populations.

Over time, it is possible for mortality rates to change, or even decrease, as the USSE industry works to address avian-solar issues through more environmentally-conscious siting decisions and the implementation of more effective minimization and mitigation measures. In fact, cost effective mitigation measures have already been identified to reduce mortality risk. For example, Walston et al. [48] reported that measures to alter the standby positioning of heliostats at USSE facilities employing power tower technologies could significantly reduce the amount of heat flux around the tower receiver and thus reduce flux-related mortality risk at CSP facilities. Additional studies to identify optimal project siting locations that avoid major avian migratory routes, stopover sites, and important habitats will also work to reduce regional mortality risk. These activities hold promise for the future of solar energy industry to become a low cost and low conflict source of electricity.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at http:// dx.doi.org/10.1016/j.renene.2016.02.041.

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EXHIBIT 6

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Assessing the impacts of a utility-scale photovoltaic solar energy facility on birds in the Northern Cape, South Africa

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ABSTRACT

Solar energy is a promising alternative to reduce South Africa's dependency on electricity generation from fossil fuels, since the country has one of the world's most favourable solar energy regimes. Utility-scale solar energy developments can impact bird communities through habitat loss and collision mortality, but there are few studies of the impacts of utility-scale photovoltaic (PV) facilities on birds. This study reports how one of South Africa's largest PV facilities (96 MW, 180 ha) has altered bird communities and assesses the risk of avian collision mortality. Bird species richness and density within the PV facility (38 species, 1.80 ± 0.50 birds ha ¹) tended to be lower than the boundary zone (50 species, 2.63 ± 0.86 birds ha ¹) and adjacent untransformed land (47 species, 2.57 ± 0.86 birds ha ¹). Only eight fatalities were detected during 3 months of surveys of the solar field for bird carcasses and other signs of collisions. The extrapolated mortality for the facility was 435 (95% CI 133–805) birds per year (4.5 bird fatalities MW ¹·yr ¹; 95% CI, 1.5–8.5). No threatened species were impacted by the PV facility, but further data are required to better understand the risk of PV solar energy developments on birds.

1. Introduction

South Africa is one of the most carbon-intensive countries in the world [1], ranking among the poorest performers in terms of emissions level, development of emissions, and efficiency [2]. In terms of the Copenhagen Accord, South Africa pledged to reduce carbon emissions 34% below the business-as-usual trajectory by 2020, and 42% by 2025 [3]. Accordingly, a target of 17 800 MW (Megawatt) of new generation capacity from renewable sources was set for 2030 [4]. Solar energy is seen as a key facet of this process [5]; [6].

South Africa has one of the highest potential solar energy regimes in the world, making it ideal for PV-based solar energy generation [3]; [5]. The Northern Cape Province, which has the most favourable radiation levels, has attracted most utility-scale photovoltaic (PV) and all of the concentrated solar power (CSP) projects approved to date [7]; [5]. Technological advancements and

cost reductions have resulted in PV now contributing more than a third of South Africa's renewable energy capacity [5]. The rapid development of PV facilities raises concerns about the potential impacts on bird populations, especially as the scope and magnitude of these impacts remain poorly understood [8]: [9]: [10]: [11]

of these impacts remain poorly understood [8]; [9]; [10]; [11]. Utility-scale solar PV facilities require ca 2 5 ha MW $^{-1}$ [11], and thus occupy large areas where there is often the complete removal of vegetation [9,12]. It is this tendency to destroy, degrade or fragment large areas of natural habitat that has stimulated most concern to date [9], especially when threatened birds or those with restricted ranges and habitat requirements are displaced. Recent findings at PV facilities in North America suggest that collision mortality impacts may also be significant [13]; [14]. The "lake-effect" hypothesis suggests that waterbirds mistake large expanses of solar arrays for water bodies, colliding with the infrastructure as they attempt to land. This could either result in direct mortality or leave individuals injured or stranded, rendering them vulnerable to predators [14]. Glare and polarised light may also attract insects, resulting in aggregations of insectivorous birds, further increasing collision risks [9,15,16]. There have been no studies to substantiate or refute these hypotheses to date [9,14,17], but the lack of evidence

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may reflect the paucity of monitoring effort more than an absence of collision risk. Only one study that systematically monitored avian fatalities at a utility-scale PV facility has been published in the primary literature. Walston et al. [17] used data collected at a 250 MW PV facility (California Valley Solar Ranch) in the USA over one year (August 2012—August 2013) by Harvey & Associates [13]. Weekly searches of 20% of the facility found 368 fatalities, but this estimate was not adjusted for searcher efficiency or scavenger removal, and included casualties on the fence-line and powerlines, as well as in the solar array.

Unlike some components generally associated with solar facilities e.g. power lines [18–20], there are no clear patterns in the types of birds affected by solar panels. Most peer-reviewed publications only discuss the potential impacts, with little supporting empirical evidence [8]; [9,11]. Empirical research following systematic, repeatable and standardised sampling protocols to assess the impacts of PV facilities on birds is essential to inform biodiversity management and monitoring guidelines. This study reports how the development of a large PV facility has affected bird communities in the semi-arid Northern Cape, South Africa, and provides the first estimates of collision risks for birds at a PV facility in this region. It improves our knowledge of the impacts of utility-scale PV facilities and assesses whether mitigation measures are warranted to ensure a sustainable industry roll-out across southern Africa.

2. Methods

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2.1. Study site

The study was conducted at the 96 MW Jasper PV facility (28° 18' S 23° 22' E), which has a footprint of 180 ha ca 30 km east of Postmasburg in South Africa's Northern Cape Province. The facility is adjacent to the 75 MW Lesedi PV project. Jasper contains 325 360 fixed-tilt solar panels, facing north at a 20° angle. The top of each panel is 1.86 m off the ground and successive rows are spaced 3.11 m apart. The facility is surrounded by a narrow cleared area with a perimeter track inside a 2-m high double fence that consists of an outer ribbon mesh and inner electric fence. Waste water containing chemicals from the panel cleaning process is disposed of in a 20×20 m evaporation pond next to the administration block. Outside the fenced area, a 50-150 m wide buffer zone, which remained largely untransformed during the construction process, extends around the facility and is fenced off from the remainder of the farm by a standard 1.2-m high livestock fence. The north edge of the facility has a 1000 m2 switchyard with a 5-km long 132 kV transmission line linking to the national power grid. The facility was commissioned in 2014, and after construction, regrowth of grass and low groundcover was promoted between the solar arrays.

The facility lies within the Eastern Kalahari Bushveld bioregion of the Savanna Biome and consists of open savanna grassland scattered with dense bushes and occasional trees [21]. There are no rivers in the immediate area, apart from a seasonal stream southwest of the site. The surrounding land is used for cattle and horse grazing, and there are several watering points for livestock. An estimated 187 bird species could occur within the study area, of which six are red-listed and 53 are endemic/near-endemic to southern Africa [22]; [23].

2.2. Changes in bird communities

Standard line transect sampling procedures [24] were used to estimate bird densities in three areas: the solar facility, its boundary (including the perimeter fence, evaporation pond, and buffer zone),

and the adjacent untransformed landscape. Elevated vantage points were included in each transect within the facility to improve visibility between the solar panels. All birds seen or heard were identified using binoculars or by call and the perpendicular distance between observer and bird was estimated. Surveys were conducted by one observer throughout the study, took place within 4 h of sunrise when bird activity was highest, and on relatively calm days. The sequence of observations was randomised among sites to ensure different starting points for each survey [24].

2.3. Collision mortality

At the start of the study, the entire facility was searched to remove old bird carcasses. Thereafter regular mortality surveys were conducted for three months, from September to December 2015. Carcass searches took place by walking between rows of solar panels, checking beneath the solar panel units (SPUs) and the surfaces of the panels for any signs of collision. In addition to carcasses, evidence of collision was inferred from: (1) smudge marks (e.g. blood or dust imprints) and feathers on the panels, or (2) feather spots consisting of ten or more feathers of any type in an area <3 m², or at least two wing flight feathers or five tail feathers within 5 m of each other. The solar field was divided into three sample areas, with effort distributed evenly over the subset of panels selected for routine sampling. To limit the loss of carcasses to scavengers [25,26], one set of solar arrays in each area (28880-31160 SPUs, representing 9-10% of each sample area) was searched every 4 days for the first six weeks and every 7 days thereafter, whereas the second set (24920-32760 SPUs; 8-10% of the total area) was surveyed every 14 days. Total coverage was close to 30% per search-interval category.

Bird mortalities arising from other infrastructure associated with the solar facility were also monitored. The evaporation pond and substation was checked every 4 days. The perimeter fence was subdivided into 3 sections, with 55% (4.03 km) checked every 4 days, 9% (0.65 km) every 7 days, and 36% (2.60 km) every 14 days. Searches were conducted by driving slowly (~10 km h ¹) along the track just inside the fence, or on foot where the track diverged from the fence. The transmission line linking the solar facility to the national grid was surveyed monthly by two searchers on foot, following a meandering transect underneath the lines and surveying for fatalities within approximately 10—15 m of the power line [27].

2.4. Searcher efficiency trials

Searcher efficiency trials were conducted to quantify the probability of carcass detection among the SPUs [17,28]. In contrast to wind-energy fatalities, injuries or fatalities were unlikely to result in dismemberment [29], so the trials used intact carcasses. Bird carcasses (n = 30), which had been stored frozen and marked with small plastic leg rings to distinguish them from natural mortalities [30], were deployed in what were thought to be likely spots on, adjacent to, or underneath panels throughout a defined area in the solar field. This area was then searched by independent observers using the standardised survey procedure for carcass detection, recording the location and identification of carcasses [31]. Immediately after each trial, undetected carcasses were retrieved to confirm that they had not been removed by scavengers. Detection probabilities were estimated in relation to two covariates: location relative to the SPUs (adjacent or underneath) and bird size (small [<100 g], medium [100-1000 g] or large [>1000 g]; Appendix A).

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2.5. Carcass persistence trials

Carcass persistence trials estimated the probability that a carcass would be detectable by observers searching at fixed search intervals (Walston et al., 2015; [25]. Only the influence of carcass size was considered; seasonal and inter-annual variation in persistence rates were not considered due to the relatively short study period [29]. Over the course of the study, 45 bird carcasses (30 small, 10 medium and 5 large) were placed throughout the facility among the SPUs and along the perimeter fence (Appendix A). At most five carcasses were placed every 1-2 weeks to avoid scavenger swamping [29,30]. All carcasses were marked with a plastic leg band and handled with latex gloves to reduce the risk of leaving scent traces which may be used as cues by potential scavengers [31,32]. Carcasses were checked until they disappeared or deteriorated to a point where they would no longer be detected as a fatality. They were visited daily for the first 5 days, every other day from day 7-15 and every seven days thereafter until 4 weeks after deployment. The state of carcasses was categorised as: (1) intact, (2) scavenged [carcass dismembered, or flesh removed], (3) feather spot, or (4) removed [not enough remains to be considered a fatality]. A subset of carcasses was monitored using Ltl-5310 ACORN motion-triggered cameras to identify the main scavengers in the study area.

2.6. Data analyses

Distance 6.2 was used to generate density estimates (birds·ha ¹) for the most abundant species and the entire community. Suitable truncation points were determined and the distance data were grouped into intervals (0–20 m, 21–50 m, 51–100 m, 101–200 m, over 200 m). Models were fitted and assessed using Akaike's Information Criterion [33]. A Welch's t-test was used with R 3.2.2 to assess differences in bird density. Correspondence Analysis (CA) was used to assess variation in bird community

composition among sample areas by plotting the species and sample area scores (e.g. Ref. [34]. The 23 most abundant species were selected to analyse the degree of avoidance. Each species is relative frequency at the facility γi (lf) was compared to its frequency at the untransformed landscape γi (lu) with the use of chisquare goodness-of-fit tests or Fisher exact tests (expected numbers lower than 5) with a Bonferroni correction (e.g. Ref. [34]. Individual species frequencies γi , were defined as the ratio of species i's abundance to the total number of birds. Scores located close to the y=x line indicated indifference, while overrepresented species at the facility would be above the line and underrepresented species under the line. Species were allocated to one of four habitat groups (shrub/woodland species, open country/grassland species, aerial insectivores and generalists; Table 1) based on their preferred habitat from Hockey et al. [35].

The estimated number of birds killed by collisions was extrapolated from the observed collision data, correcting for detection biases and carcass persistence (e.g. Refs. [36,37]. For any solar array i, the 3 month study period was divided into Si consecutive intervals of length I_{ij} representing the total number of intervals and days per solar array. The total number of fatalities (F_{ij}) at the ith solar array in the jth interval was grouped by carcass size and search-interval category (4, 7, and 14 days), for which the probability of detection was the same for all carcasses in the set. Fatalities were calculated as the number of carcasses observed (cijk) over the probability of detection (gijk), calculated as the product of the probability of a carcass being observed (p) and the probability of a carcass persisting (r), and was applied to all birds found at the end of interval length I. Searcher efficiency was estimated as the proportion of carcasses found by searchers, analysed per size class and carcass location. Carcass persistence was estimated as the proportion of carcasses remaining after a given search interval category. Fatality rates were reported per GWh and MW, and 95% confidence intervals around the estimates were obtained by bootstrapping the mortality data in Excel (n=1000 replicates). Chi-squared

Table 1

The 23 most abundant bird species counted during 50 transect counts (5 replicates for each of the 5 transects per sample area) indicating total counts and density estimates (birds-ha⁻¹) for species recorded within the solar facility and untransformed landscape (n.s. = not significant).

Common name	Scientific name	PV facility		Untransform	ned land	Density
		Count	Density	Count	Density	p-value
Shrub/woodland species						
Black-chested prinia	Prinia flavicans	0	-	29	0.58 ± 0.42	< 0.001
Chestnut-vented tit-babbler	Sylvia subcaeruleum	0	-	21	0.99 ± 0.35	< 0.001
Violet-eared waxbill	Granatina granatinus	0	_	21	0.62 ± 0.98	< 0.001
Kalahari scrub-robin	Cercotrichas paena	0		18	0.80 ± 0.54	< 0.001
Karoo scrub-robin	Cercotrichas coryphaeus	0	-	10	0.29 ± 0.55	n.s.
African red-eyed bulbul	Pycnonotus nigricans	7	_	25	0.37 ± 0.27	n.s.
Open country/grassland	A State of the Sta					
Eastern clapper lark	Mirafra fasciolata	7	<u> </u>	20	0.78 ± 0.82	n.s.
Desert cisticola	Cisticola aridulus	24	1.27 ± 1.21	19	0.5 ± 0.31	n.s.
Ant-eating chat	Myrmecocichla formicivora	15	0.19 ± 0.41	18	0.4 ± 0.86	n.s.
Spike-heeled lark	Chersomanes albofasciata	15	0.44 ± 0.64	5	0.38 ± 0.65	n.s.
Plain-backed pipit	Anthus leucophrys	11	0.31 ± 0.59	2	_	n.s.
Aerial species	Account of the second of the second					
Alpine swift	Tachymarptis melba	4	0.19 ± 0.41	6	_	n.s.
Rock martin	Ptyonoprogne fuligula	11	0.17 ± 0.42	6	_	< 0.001
Greater-striped swallow	Cecropsis cucullata	10	0.49 ± 0.59	16	0.42 ± 0.36	n.s.
Generalist species						
Cape turtle dove	Streptopelia capicola	12	-	23	0.55 ± 0.97	n.s.
Familiar chat	Cercomela familiaris	32	1.54 ± 1.09	11	_	< 0.001
Chat flycatcher	Bradornis infuscatus	5	0.26 ± 0.34	2		n.s.
Fiscal flycatcher	Sigelus silens	14	0.25 ± 0.56	10	0.36 ± 0.32	n.s.
Fawn-coloured lark	Calendulauda africanoides	16	0.56 ± 0.39	24	0.94 ± 0.66	n.s.
Cape bunting	Emberiza capensis	4	0.28 ± 0.79	24 0 6 5	_	n.s.
Cape sparrow	Passer melanurus	28	0.38 ± 0.38	6	_	< 0.001
Black-throated canary	Crithagra atrogularis	12	0.52 ± 0.59	5	_	n.s.
Yellow canary	Crithagra flaviventris	59	0.50 ± 0.62	56	0.93 ± 0.66	n.s.

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goodness-of-fit tests were conducted in R version 3.2.2, with $\alpha = 0.05$.

3. Results

3.1. Changes in bird communities

Fifty-three bird species (Fig. 1, Appendix B) were recorded during 75 transect counts (5 replicates for each of the 5 transects per sample area), of which 22 were endemic or near-endemic to southern Africa but none was globally or nationally threatened [22]. Species richness (38 species) and average density of birds $(1.80 \pm 0.50 \text{ birds} \cdot \text{ha}^{-1})$ at the PV facility tended to be lower than the boundary (50 species, 2.63 ± 0.86 birds ha ¹) and adjacent untransformed landscape (47 species, 2.57 ± 0.86 birds·ha¹), although the difference in density was only marginally significant (t = 2.21, df = 6, P = 0.06). Of the 23 most abundant bird species, six were typical of shrub/woodland, five of open country/grassland, three were aerial insectivores, and nine were generalists (Table 1). The first axis of the CA, which explained 96% of variation in bird abundance, clearly differentiated the solar facility community from the adjacent untransformed landscape community (Fig. 1). All six shrub/woodland species were under-represented at the PV facility (Fig. 2), with five being absent from the facility (Table 1). Among the five open country/grassland species, three (eastern clapper larks Mirafra fasciolata, plain-backed pipits Anthus leucophrys and anteating chats Mymnecocichla formicivora) were over-represented in the facility (Fig. 2), but none of their densities differed significantly (Table 1). Most generalist species were represented equally in the facility and adjacent land, but familiar chats Cercomela familiaris and Cape sparrows Passer melamrus were more abundant inside the facility than in adjacent vegetation (Fig. 2, Table 1). Of the three aerial species, rock martins Ptyonoprogne fulgula were more common over the facility (Table 1).

Most birds visited the facility to forage (e.g. fiscal flycatchers Sigelus silens and chat flycatchers Bradomis infuscatus used the solar panels as foraging perches), while some species used the SPUs for shade and shelter (e.g. Orange River francolins Scleroptila levaillantoides foraged under the SPUs). Some granivores visited the evaporation pond to drink (e.g. yellow canaries Crithagra flaviventris and Cape sparrows), while Cape wagtails Motacilla capensis foraged around the pond. Five species were found nesting on the solar panel supports: Cape sparrows (n = 2), and one nest each of familiar chat, African red-eyed bulbul Pycnonotus nigricans, laughing dove Streptopelia senegalensis, and Cape wagtail.

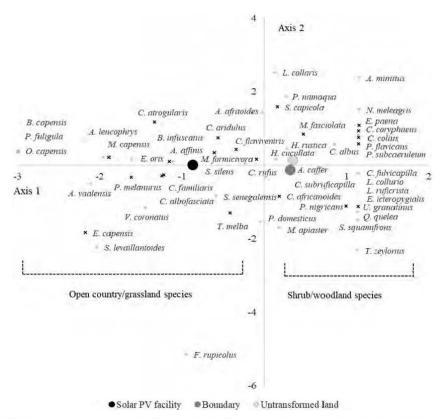


Fig. 1. Biplot of the first two axes of the Correspondence Analysis (CA) representing the 53 bird species distributed over the solar facility, boundary, and untransformed landscape at the Jasper PV solar facility in the Northern Cape, South Africa. Crosses represent the 23 most abundant species within and around the development footprint, which were retained for further analysis.

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0,14

0,12

0,1

0,08

E. Visser et al. / Renewable Energy xxx (2018) 1 10 C. flaviventris ■ C. familiaris P. melanurus C. aridulus C. albofasciata M. formicivora C. africanoides S. capicola P. fuligula atrogularis C. cucullata

ARTICLE IN PRESS

Relative frequency at solar facility A. leucophrys . P. nigricans 0,04 M. fasciolata infuscatus E. capensis 0,02 S. subcaeruleum G. granatimus_{P.} flavicans C. coryphaeus C. paena 0 0,02 0.04 0 0,06 0,08 0,1 0,12 Relative frequency at untransformed land △ Aerial species ■ Generalist species Open country/grassland Shrub/woodland species

Fig. 2. Comparing relative frequencies between the PV facility and untransformed landscape for 23 most abundant species, grouped according to habitat dependencies (aerial, generalists, open country/grassland and shrub/woodland species).

3.2. Collision mortality

The initial clearance surveys detected three fatalities among the SPUs and perimeter fence. Thereafter, eight fatalities of six bird species were recorded (Table 2); seven among the SPUs (0.003 birds·ha 1·month 1) and one Orange River francolin at the fence-line (0.002 birds·km 1·month 1). Most fatalities were inferred from feather spots. No fresh carcasses or evidence of damaged or imprinted solar panels that might have suggested collision were recorded, making it impossible to infer cause of death. Most fatalities (7 of 8) were located under the SPUs, suggesting that either the birds did not collide with the upper surfaces of the panels, or they were moved by scavengers after collision. The fence-line fatality of an Orange River francolin resulted when the bird was trapped between the inner and outer fence. Three red-crested korhaans Lophotis ruficrista, another large-bodied bird, were unable to escape from between the two fences without the help of facility personnel. Two rock monitor lizards Varanus albigularis also were rescued from between the two fences. Only one fatality was detected on other infrastructure: a crowned lapwing Vanellus coronatus dead on the approach road, probably hit be a vehicle. No collision or electrocution mortalities were found under the transmission line linking the facility to the national grid.

3.3. Searcher efficiency trials

Overall 74% of trial carcasses were detected by observers, with both carcass size ($\chi^2 = 19.75, \, df = 2, \, P < 0.001$) and location relative to the SPUs ($\chi^2 = 9.26$, df = 1, P < 0.001) influencing the probability of detection. Large birds (100%) and medium-sized birds (90%) were

Summary of bird fatalities detected during 3 months of avian mortality surveys at the PV facility in the Northern Cape, South Africa. Fatalities recorded during the initial clearance surveys are in brackets compared to the fatalities found during the regular surveys.

Size class	Common name	Scientific name	SPUs	Fence
Small (<100 g)	Fiscal flycatcher	Sigelus silens	2 (1)	
100	Red-eyed bulbul	Pycnonotus nigricans	No.	0(1)
	Eastern clapper lark	Mirafra apiata	1 (0)	2.3
Medium-large (>100 g)	Orange River francolin	Scleroptila levaillantoides	3 (1)	1(0)
	Speckled pigeon	Columba guinea	1 (0)	1104.
Total			7 (2)	1(1)

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more likely to be detected than small birds (60%), as were birds under the SPUs, where there was less vegetation than between the SPUs (Table 3).

3.4. Carcass persistence trials

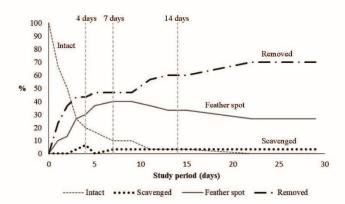
Overall, 20% of bird carcasses disappeared within 24 h of placement, 36% after one week, and 53% after 4 weeks (Fig. 3). Large

Table 3
Results of the searcher efficiency trials by size class and location relative to the Solar
Panel Units (SPUs) at the PV facility.

Size class	Adjacent to SPUs	Underneath SPUs	Total
Small (<100 g)	38/66 (58%)	10/14 (71%)	48/80 (60%)
Medium (100-1000 g)	14/17 (82%)	22/23 (96%)	36/40 (90%)
Large (>1000 g)	5/5 (100%)	13/13 (100%)	18/18 (100%)
Total	57/88 (65%)	45/50 (90%)	102/138 (74%)

carcasses were more likely to persist than small carcasses $(\chi^2=8.14, \, df=1, \, P<0.01)$. Only 30% of small bird carcasses were still detectable after 4 weeks, compared to 80% of medium-large carcasses, although both size classes were mainly represented by feather spots (Fig. 3). Medium-sized carcasses were reduced to large feather spots, usually after being moved under the SPUs. Large carcasses were mostly reduced to scattered bones and feathers. Feathers typically remained within 5 m of the placement location. Camera traps revealed that small carcasses were generally removed whole by scavengers, including African polecats *lctonyx striatus* (n = 4), yellow mongooses *Cynictis penicillata* (n = 3) and feral cats *Felis catus* (n = 2). Avian scavengers typically left the remains in situ and included Orange River francolins (n = 2) and pied crows *Corvus albus* (n = 1). Scavenging by birds and yellow mongooses occurred during the day, whereas polecats and feral cats were active at night.

a) Small birds



b) Medium-large birds

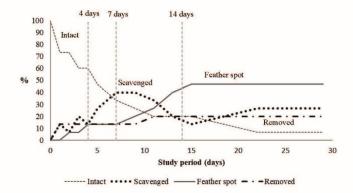


Fig. 3. Percentage of (a) small (<100 g, n = 30) and (b) medium-large (>100 g, n = 15) bird carcasses still detectable at increasing intervals after deployment at the Jasper PV solar facility in the Northern Cape, South Africa. The vertical dashed lines represent the search intervals used in this study and indicate the respective level of carcass persistence.

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3.5. Fatality estimation

Extrapolated bird mortality within the solar field at the Jasper PV facility was 435 birds-yr 1 (95% Cl 133–805) over 323 920 solar panels, which is 2.42 fatalities-GWh 1 (0.74–4.47) over 180 GWh 1 , and 4.53 fatalities-MW 1 (1.51–8.50) over 96 MW (Table 4). The broad confidence intervals result from the small number of birds detected. The mortality estimate is likely conservative because detection probabilities were based on intact birds, and probably decrease for older carcasses and feather spots. Too few fatalities were detected for the associated infrastructure (perimeter fence, evaporation pond, power lines and substation), to allow fatality estimates to be extrapolated.

4. Discussion

4.1. Changes in bird communities

The distribution of birds is determined by the distribution and abundance of resources. The development of the PV solar facility cleared a large area of arid savanna and replaced it with short grassland with a dense cover of solar panels. Such changes are detrimental to some bird species and beneficial to others. Both bird species richness and density was lower at the PV facility than the surrounding area, as is typical of studies at other PV facilities [12]; [13]. Species composition also differed to some extent, largely reflecting the loss of shrub/woodland species. However, none of the species affected were threatened or rare, so overall the facility has had little impact on this bird community. Several open country/ grassland bird species were more frequently encountered within the facility, while other species showed no adverse impact, perhaps due to their ability to adapt to habitat disturbance and modification [35,38]. The facility might supplement and/or complement habitat resources such as foraging, hunting, and nesting sites [39]. This can be due to microclimatic changes initiated by the PV canopies [40], creating new microhabitats due to additional shading and regrowth of native vegetation as well as providing additional perching and

4.2. Collision mortality

While any bird flying over the solar facility, or using it extensively, is at risk of collision, the extent thereof likely depends on biological, topographical, meteorological and technical factors [9,18,27,36]. Although only a few birds were found dead at the facility, most of the affected species were overrepresented compared to adjacent habitats, and thus were species attracted to the facility.

As has been reported at other solar facilities, resident species and passerines accounted for most of the avian mortality [17], presumably because they are the most abundant birds. However, the most frequently affected species, the Orange River francolin, is a relatively uncommon species; it is a larger bird that might be particularly at risk of collision mortality if panicked by a predator while feeding under the solar arrays. These results indicate that, similar to studies in the wind-energy industry, the level of bird use and behaviour at the site are important factors to consider when assessing potential risk at solar facilities [41]; [42].

Consistent with previous monitoring programmes [14,17], most fatalities were inferred from feather spots, making it difficult to determine the cause of death. There was no evidence that birds were responding to polarised light [12]. Studies on window collisions [43,44] suggest that collision mortality could be reduced by fitting solar panels with contrasting bands and/or spatial gaps [16] to increase panel visibility and reduce the likelihood of birds perceiving the solar field as a water body (lake effect) [14,16,45]. However, contrasting bands might reduce energy output [16,45] and thus increase the area required to generate power. More information on the severity and cause of fatalities is required before such mitigation measures can be recommended with confidence.

Large-bodied birds and monitor lizards were trapped between the ribbon mesh and electric fence. This is a site-specific problem linked to the double fence design; few fence-related fatalities have been reported at solar facilities with single-fence designs (e.g. Ref. [46]. No fatalities were documented among the power lines, substation, or evaporation pond, most likely due to the scarcity of large-bodied birds, and/or the short study period. Bird flight diverters can be used to increase the visibility of powerlines erected at facilities [19]. Such devices can reduce powerline collisions by 50–80% [19], although their efficacy varies among bird groups (e.g. Ref. [47], Jenkins et al. [19] suggest that devices should be at least 20 cm long and spaced every 5–10 m along earth wires or conductors.

Another potential method to reduce collision risk is to reduce attractiveness of PV facilities is by clearing vegetation between panels to decrease the availability of food and nesting sites [14]. However, this might have other ecological consequences as vegetation removal exacerbates habitat loss, which is perhaps the most significant threat to biodiversity from solar energy facilities [11,48]. Our bird community studies suggest that it is better to provide a beneficial environment for at least some bird species, but it would be better to locate PV facilities in areas with low biodiversity value, away from sensitive or important bird habitats [7,11,49].

The lack of standardisation in data collection protocols, reporting units, and bias correction provides sparse and inconsistent

Table 4

Variables used per size class, search interval, and sample area to calculate the overall annual bird fatalities at the Jasper PV solar facility in the Northern Cape, South Africa. This includes number detected (c), searcher efficiency (p), carcass persistence (r), and detection probability (g).

Infrastructure	Size	Search interval (days)	Area covered (%)	Duration (days)	c (%)	p(%)	r (%)	g (%)
SPUs	Small	4	28	31	1	71	57	40
		7	28	52	1	71	53	38
		14	27	45	1	71	40	28
	Medium/large	4	28	31	2	98	87	85
		7	28	52	1	98	87	85
		14	27	45	1	98	80	78
Perimeter fence and evaporation pond	Small	4	100	31	0	_	_	-
		7	100	52	0		-	
		14	100	45	0	1	2	124
	Medium/large	4	100	31	1	98	87	85
		7	100	52	0	100	-	-
		14	100	45	0	_	+	-
Total					8			

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avian-fatality data records for solar facilities [14,17,25]. Comparing avian mortality rates among PV facilities is complicated by sampling at different geographic scales and temporal periods. In order to fully understand the risk of collision mortality among solar facilities and other sources of electricity generation, fatality estimates need to be calculated through standardised protocols in order to account for potential biases and provide meaningful comparisons through estimates per GWh or MW [17,25,50]. The extrapolated estimate of 2.42 fatalities GWh $^{\,1}$ may be an overestimate because some feather spots may not have represented a fatality, and some fatalities might not have resulted from the facility (i.e. occurred due to other causes). Conversely, observer bias estimates likely are optimistic, because only fresh carcasses were searched for, and observers knew they were being tested, likely increasing their vigilance relative to routine monitoring searches. The short study period could not account for seasonal and inter-annual variation, which could affect carcass monitoring, bird activity levels, and collision risk/mortality. Therefore, there is a need to collate and analyse data across spatial and temporal scales to produce robust and comparable results for the compilation of appropriate mitigation protocols to alleviate any adverse effects on species of concern and their habitats [17,31].

4.3. Monitoring challenges

Challenges to monitoring bird mortalities included differences in carcass detection in relation to bird size and location. Smaller carcasses adjacent to the SPUs were more difficult to detect due to denser vegetation cover and the panels obscuring ground visibility. The persistence trials indicated that carcass removal rates were greatest in the first week, and that small bird carcasses were removed faster because they are more easily carried away by the relatively small scavengers that could access the facility. Larger predators such as black-backed jackals Canis mesomelas or caracal Caracal caracal, which could carry off larger bird carcasses, were prevented from accessing the site by the fence. Our results highlight the need for including bird size in searcher efficiency and carcass persistence trials. The rapid removal of small carcasses suggests that there is little value in sampling at intervals of two weeks or more for these species, whereas larger species might be detected for longer. To ensure robust results, we recommend searching at least weekly during post-construction monitoring. However, persistence rates may vary between sites and should be adapted accordingly.

4.4. Recommendations for future research

We recommend using Before-After Control-Impact (BACI) study designs to assess how utility-scale PV developments impact bird communities during pre-construction through to the operational phase. A study in California found that raptor abundance was higher pre-construction than post-construction, suggesting that raptors avoid facilities once they are operational [51]. Investigating the underlying mechanisms (e.g. food availability, habitat availability, noise disturbance) that drive indirect effects on bird populations at pre-construction stage [51], can inform postconstruction management and future developments. We recommend that future studies include seasonal and/or wet-dry sampling to assess temporal and spatial variation in bird fatalities. Future studies should also assess if solar facilities attract invertebrates, potentially influencing community assemblages with cascading ecological repercussions [14]. Further research is also required to assess the impact that different vegetation management strategies have on bird communities. Comparisons of collision impact mortality rates between different solar energy technologies (e.g. fixedtilt versus single-axis tracker mounting) also are needed. The advantages and disadvantages of these technologies, including the risk for bird collisions, can be used to inform the design of future PV facilities. Lastly, it is essential to assess the cumulative impacts of utility-scale PV developments within a region. Although the impacts of a single facility might be relatively trivial, the environmental impacts can be compounded when multiple developments are erected, with unknown consequences on birds in the surrounding region [52].

5. Conclusions

The rapid expansion of utility-scale solar facilities across southern Africa raises concerns about cumulative impacts. The Northern Cape Province, which is the preferred area for utility-scale solar energy facility development, hosts a range of specialist, endemic and range-restricted species, including some of conservation concern [7,53—56]. However, continued reliance on fossilfuel consumption may result in global costs to bird populations that outweigh any effects of the industry. The apparent negative impacts of PV facilities should not hamper efforts aimed at reconciling increases in renewable energy generation with biodiversity conservation. Like other energy sources, the impact of PV facilities on birds is likely to differ on a case-by-case basis [9]. PV facilities replacing previously degraded lands can play an important role in promoting biodiversity [39], while the opposite is generally the case with developments in pristine or near-pristine habitats.

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Appendix A. List of bird species by size class and number used in the searcher efficiency and carcass persistence trials at the Jasper PV facility in the Northern Cape, South Africa.

Size class	Bird species (mass g)	Searcher efficiency	Carcass persistence
Small	(<100 g)		
	Lark-like bunting Emberiza impetuani (17 g)	2	0
	Yellow canary Crithagra flaviventris ¹ (17 g)	1	1
	Southern red bishop Euplectes orix2 (24 g)	4	4
	Fawn-coloured lark Calendulauda africanoides (25 g)	3	3
	House sparrow Passer domesticus (28 g)	0	5
	Namaqua dove Oena capensis (38 g)	5	5
	White-browed sparrow-weaver Plocepasser mahali (47 g)	1	0
Mediu	Common quail Coturnix coturnix (95 g) am (100-1000 g)	0	12
	Blacksmith lapwing Vanellus armatus (165 g)	2	2
	Crowned lapwing Vanellus coronatus (185 g)	1	1
	Green pigeon Treron calvus (230 g)	4	5
	Feral pigeon Columba livia (385 g) Large (>1000 g)	3	5 2
	Hadeda ibis Bostrychia hagedash (1250 g)	4	5

¹ adult male.

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² one breeding plumage male and three females/eclipse males.

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Appendix B. List of bird species recorded at the Jasper PV facility, boundary, and untransformed land in the Northern Cape, South Africa ($\sqrt{=}$ recorded).

Common name	Scientific name	Solar facility	Boundary	Untransformed land
African red-eyed bulbul	Pycnonotus nigricans	1	/	/
Alpine swift	Tachymarptis melba	¥	1	✓
Ant-eating chat	Myrmecocichla formicivora	1	1	1
Barn swallow	Hirundo rustica	1	1	✓
Black-chested prinia	Prinia flavicans		1	/
Black-throated canary	Crithagra atrogularis	1	1	/
Bokmakierie	Telophorus zeylonus		1	/
Buffy pipit	Anthus vaalensis	/		/
Burchell's courser	Cursorius rufus	1	1	/
Cape bunting	Emberiza capensis	1	1	
Cape penduline-tit	Anthoscopus minutus		1	V
Cape sparrow	Passer melanurus	1	1	/
Cape turtle dove	Streptopelia capicola	1	1	/
Cape wagtail	Motacilla capensis	1	/	/
Chat flycatcher	Bradornis infuscatus	1	1	/
Chestnut-vented tit-babbler	Sylvia subcaeruleum		1	/
Common southern fiscal	Lanius collaris	1	1	/
Crowned lapwing	Vanellus coronatus	/		2
Desert cisticola	Cisticola aridulus	1	1	2
Eastern clapper lark	Mirafra fasciolata	/	1	2
European bee-eater	Merops apiaster	,		2
Familiar chat	Cercomela familiaris	/	1	
Fawn-coloured lark	Calendulauda africanoides	,	,	2
Fiscal flycatcher	Sigelus silens		,	2
Greater-striped swallow	Cecropsis cucullata	,	,	,
	Cisticola subruficapilla	902		
Grey-backed cisticola	Numida meleagris	27 6	· ·	,
Helmeted guineafowl House sparrow	Passer domesticus		· .	9
Kalahari scrub-robin		1960		•
Karoo scrub-robin	Cercotrichas paena			· ·
	Cercotrichas coryphaeus			
Laughing dove	Streptopelia senegalensis	~	5	
Little swift	Apus affinis		•	
Namaqua dove	Oena capensis			
Namaqua sandgrouse	Pterocles namaqua			6
Neddicky	Cisticola fulvicapilla	W		~
Northern black korhaan	Afrotis afraoides			~
Orange river francolin	Scleroptila gutturalis	~	/	
Pied crow	Corvus albus		/	~
Plain-backed pipit	Anthus leucophrys	/	/	/
Red-backed shrike	Lanius collurio		/	/
Red-billed quelea	Quelea quelea		/	/
Red-crested korhaan	Lophotis ruficrista		/	>
Rock kestrel	Falco rupicolus	1	1	
Rock martin	Ptyonoprogne fuligula	/		
Scaly-feathered finch	Sporopipes squamifrons		1	/
Southern red bishop	Euplectes orix	7	1	/
Spike-heeled lark	Chersomanes albofasciata	1	1	✓
Spotted thick-knee	Burhinus capensis	1		
Violet-eared waxbill	Granatina granatinus		/	/
White-backed mousebird	Colius colius		1	>
White-rumped swift	Apus caffer	/	1	/
Yellow canary	Crithagra flaviventris	1	1	>
Yellow-bellied eremomela	Eremomela icteropygialis		1	1

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EXHIBIT 7

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REVIEW

Avian interactions with renewable energy infrastructure: An update

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ABSTRACT

Energy infrastructure is widespread worldwide. Renewable energy technologies, which are expanding their footprint on the landscape and their contribution to energy availability, represent a different kind of infrastructure from extractive energy technologies. Although renewable energy sources may offer a 'greener alternative' to traditional extractive energy sources, mounting evidence suggests that renewable energy infrastructure, and the transmission lines needed to convey energy from renewable energy facilities to users, may impact birds. Peer-reviewed literature historically has focused on the direct effects of electrocution and, to a lesser extent, collisions with overhead power systems, and on avian collisions at wind energy facilities, with less consideration of indirect effects or other energy sectors. Here, we review studies that have examined direct and indirect effects on birds at utility-scale onshore windand solar-energy facilities, including their associated transmission lines. Although both direct and indirect effects appear site-, species-, and infrastructure-specific, generalities across energy sectors are apparent. For example, largebodied species with high wing loading and relatively low maneuverability appear to be especially susceptible to direct effects of tall structures, and the risk of collision is likely greater when structures are placed perpendicular to flight paths or in areas of high use. Given that all infrastructure types result in direct loss or fragmentation of habitat and may affect the distribution of predators, indirect effects mediated by these mechanisms may be pervasive across energy facilities. When considered together, the direct and indirect effects of renewable energy facilities, and the transmission lines serving these facilities, are likely cumulative. Ultimately, cross-facility and cross-taxon meta-analyses will be necessary to fully understand the cumulative impacts of energy infrastructure on birds. Siting these facilities in a way that minimizes avian impacts will require an expanded understanding of how birds perceive facilities and the mechanisms underlying direct and indirect effects.

Keywords: avian, direct effects, indirect effects, mitigation, power line, solar, wind

Actualización de las interacciones entre aves y las estructuras de energía renovable

RESUMEN

La infraestructura energética está ampliamente distribuida en todo el mundo. Las tecnologías de energía renovable están expandiendo su huella en el paisaje y su contribución a la disponibilidad de energía, y representan un tipo diferente de infraestructura a la de las tecnologías extractivas de energía. Aunque las fuentes de energía renovable ofrecen una "alternativa más verde" en comparación con las fuentes tradicionales de extracción de energía, existe bastante evidencia que sugiere que la infraestructura de energía renovable y las líneas de transmisión necesarias para transportar la energía hacia los usuarios podrían afectar a las aves. La literatura científica tradicionalmente se ha enfocado en los efectos directos de la electrocución y, en menor medida, en las colisiones con los sistemas aéreos de energía y con las estructuras de energía eólica. En cambio, ha habido escasa consideración de sus efectos indirectos y de otros sectores energéticos. En este trabajo revisamos estudios que investigaron los efectos directos e indirectos sobre las aves a la escala de instalaciones terrestres de energía eólica y solar, incluyendo sus líneas de transmisión. Aunque los efectos directos e indirectos parecen ser específicos para cada sitio, especie y tipo de energía, existen generalidades evidentes entre diferentes sectores energéticos. Por ejemplo, las especies de mayor tamaño, con alta carga alar y maniobrabilidad relativamente baja parecen ser especialmente susceptibles a los efectos directos de las estructuras altas, y el riesgo de colisión probablemente es mayor cuando las estructuras se ubican perpendiculares al sentido del vuelo o en áreas con alto uso. Dado que todos los tipos de infraestructura resultan en la pérdida directa del hábitat o en su fragmentación y podrían afectar la distribución de los depredadores, los efectos indirectos mediados por estos mecanismos pueden ser comunes entre diferentes instalaciones energéticas. Cuando se consideran en conjunto, los efectos directos e indirectos en las instalaciones de energía renovable y en las líneas de transmisión asociadas probablemente son acumulativos. Finalmente, será necesario hacer meta análisis a través de varios tipos de instalaciones y taxones para entender completamente los impactos acumulativos de la infraestructura energética

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sobre las aves. La localización de estas instalaciones de forma que minimice el impacto sobre las aves requerirá un mayor entendimiento acerca de cómo las aves perciben las instalaciones y de los mecanismos que subyacen a los efectos directos e indirectos.

Palabras clave: aves, efectos directos, efectos indirectos, eólico, líneas de energía, mitigación, solar

Concerns regarding the depletion of fossil fuels, global climate change, and energy security have triggered rapid growth in the use of renewable energy technologies. For example, in the United States (U.S.), wind energy capacity increased by \sim 140% from 25,000 megawatts (MW) in 2008 to >61,000 MW in 2013 (American Wind Energy Association 2014). Collectively, ~13% of U.S. electricity generated in 2014 was derived from renewable energy sources (e.g., biomass [1.7%], geothermal [0.4%], hydroelectric [6.0%], solar [0.4%], and wind [4.4%]; U.S. Energy Information Administration 2015a). Continued growth of the wind energy sector is predicted to meet the U.S.'s wind energy target of 20% of all energy used by 2030 (U.S. Department of Energy 2008). Although government targets are centered on wind energy, the expansion of other renewable energy sectors also is expected (U.S. Energy Information Administration 2015b). In particular, projections suggest that the solar energy sector could meet 14% of electricity demands in the contiguous U.S. by 2030 and 27% by 2050 (U.S. Department of Energy 2012).

Renewable energy as a 'greener alternative' to the combustion of fossil fuels offers important environmental benefits over traditional energy sources, such as reductions in greenhouse gas emissions (Panwar et al. 2011). Yet, increasing evidence of direct and indirect effects has raised concerns regarding the potential impacts of renewable energy infrastructure on birds. Avian collisions with wind turbines (i.e. direct effects) are well documented and have received the most attention to date (e.g., Smallwood and Thelander 2008, Loss et al. 2013, Morinha et al. 2014). In comparison, studies of the direct effects of other types of renewable energy infrastructure on birds have been limited (but see McCrary et al. 1986, Lovich and Ennen 2011). Further, relatively few studies have considered the potential for indirect effects on avian behavior, spatial ecology, or demographics resulting from increased disturbance, changes in trophic interactions, or changes in habitat availability and connectivity (reviewed by Drewitt and Langston 2006, Zwart et al. 2016a). Renewable energy infrastructure often is accompanied by the construction of new transmission lines to connect renewable energy facilities to the existing power line network. Thus, the direct and indirect effects of multiple infrastructure types at renewable energy facilities need to be considered to identify the cumulative effects of a national (and global) transition from extractive to renewable energy production.

Of the studies that have assessed interactions between renewable energy infrastructure and birds, many have primarily targeted specific management crises, often focusing on species of conservation concern (e.g., Greater Sage-Grouse [Centrocercus urophasianus]: LeBeau et al. 2014; Greater Prairie-Chicken [Tympanuchus cupido]: Smith et al. 2016) in areas targeted for development (e.g., the Great Plains of North America; Harrison 2015, Whalen 2015, Winder et al. 2015). Thus, studies have been necessarily limited and inconsistent in the focal species addressed, experimental design, and study site. As a consequence, developing general siting guidelines and mitigation strategies for new facilities remains challenging. Given the projected increase in renewable energy infrastructure throughout the U.S. (U.S. Department of Energy 2008, U.S. Energy Information Administration 2015b), it is critical that we develop a more comprehensive understanding of the effects of renewable energy infrastructure on birds so that informed siting guidelines can be developed and implemented.

Here, we review recent studies of the direct and indirect effects on birds from utility-scale onshore wind- and solar-energy facilities and their accompanying transmission lines. We focused on these energy sectors because of their projected increase in the U.S. (U.S. Department of Energy 2008, U.S. Energy Information Administration 2015b). Our goals were to: (1) provide an up-to-date and consolidated summary of direct and indirect impacts of utility-scale onshore wind- and solar-energy infrastructure and associated power lines on birds based on peer-reviewed literature; (2) use our findings to inform siting guidelines; and (3) highlight important knowledge gaps and areas for future research.

KNOWN IMPACTS OF UTILITY-SCALE ONSHORE WIND-AND SOLAR-ENERGY INFRASTRUCTURE ON BIRDS

To summarize the impacts of utility-scale renewable energy infrastructure, we conducted a literature review to identify studies that empirically tested the effects of energy infrastructure on birds (i.e. not commentaries or predictive studies). We did so by using combinations of the following search terms in Web of Science (formerly ISI Web of Knowledge; Thomson Reuters, Philadelphia, Pennsylvania, USA): avian, bird, collision, conservation, electrocution, photovoltaic cell, renewable energy infrastructure, solar energy, transmission power line, wind energy, wind farm, and wind resource area.

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Onshore Wind Energy

Direct effects. The direct effects of wind energy development on birds have received considerable attention (e.g., Smallwood and Thelander 2008, Loss et al. 2013, Erickson et al. 2014). Collisions between birds and onshore wind turbines result in impact trauma, which can result directly in death or render birds more susceptible to predation. Collisions have been documented for a wide range of taxa, including ducks (Johnson et al. 2002), grouse (Zeiler and Grünschachner-Berger 2009), raptors (De Lucas et al. 2008), and songbirds (Morinha et al. 2014). Of specific concern are fatalities of species of conservation concern (e.g., Western Burrowing Owl [Athene cunicularia hypugaea]; Smallwood et al. 2007) and species with small populations, delayed maturity, long lifespans, and low reproductive rates, for which even a few mortalities can have population-level effects (e.g., Golden Eagle [Aquila chrysaetos]: Lovich 2015; White-tailed Eagle [Haliaeetus albicilla]: Dahl et al. 2012). While the number of birds affected is uncertain (Pagel et al. 2013), estimates adjusted for searcher detection and scavenger removal suggest that between 140,000 and 328,000 birds are killed annually by collisions with turbines at wind energy facilities in the contiguous U.S. (Loss et al. 2013). For songbirds in particular, fatalities at wind energy facilities in the U.S. and Canada are estimated to be between 134,000 and 230,000 annually (Erickson et al. 2014). Avian collisions with turbines also have been documented outside the U.S. (e.g., Australia: Hull et al. 2013; Canada: Zimmerling et al. 2013; Japan: Kitano and Shiraki 2013; South Africa: Doty and Martin 2013; Western Europe: Everaert and Stienen 2007. De Lucas et al. 2012. Morinha et al. 2014), suggesting that the direct effects of wind energy facilities are of concern globally.

Intuitively, mortality rates at wind energy facilities should be related to avian abundance (Carrete et al. 2012), but a more complex suite of site-specific factors may be important (De Lucas et al. 2008, Marques et al. 2014). For example, habitats or prey that promote foraging at wind energy facilities are likely to increase collision rates (Barrios and Rodríguez 2004, Smallwood et al. 2007). Collisions may also increase when turbines are sited on landscape features, including cliffs and steep slopes, that are regularly used by hunting or migrating birds (e.g., Black Kite [Milvus migrans]; Kitano and Shiraki 2013). Weather may further increase collision risk when visibility around turbines is reduced (Kerlinger et al. 2010). For species that exploit thermals, the risk of collision may increase during weather that forces birds to gain lift from topographical features near wind turbines (Barrios and Rodríguez 2004, De Lucas et al. 2008). Collisions during migration may be particularly important because they have the potential to indirectly affect breeding populations far beyond the wind energy facility. Because most conservation efforts in North America are focused on breeding habitat, migration mortality can be a cryptic and often unrecognized effect of wind turbines.

Collision rates can additionally be affected by the design features of wind turbines. For example, collision rates between Western Burrowing Owls and wind turbines were highest at vertical axis towers, lower at tubular towers, and lowest at lattice towers, corresponding with a decline in the ability to see through the infrastructure type (Smallwood et al. 2007). Conversely, mortality rates of Eurasian Kestrels (Falco tinnunculus) and Eurasian Griffons (Gyps fulvus) were equivalent between tubular and lattice towers at a wind energy facility in the Straits of Gibraltar (Barrios and Rodríguez 2004). As turbine height increases, species that rely on lift for flight may become more susceptible to collisions (e.g., Eurasian Griffons; De Lucas et al. 2008), as may species that typically fly at higher altitudes (Loss et al. 2013). Turbine rotor diameter may also increase mortality rates through increasing the area within which birds are at risk (Loss et al. 2013; but see Barclay et al. 2007). For species attracted to artificial light sources (e.g., nocturnal migrants; Gauthreaux and Belser 2006), the use of steady-burning lights at facilities may increase mortality rates (Kerlinger et al. 2010). However, the use of flashing red lights at wind energy facilities, as recommended by the Federal Aviation Association, does not appear to influence collision rates between infrastructure and nocturnal migrants (Kerlinger et al. 2010). Fatalities may also increase when turbines are positioned perpendicularly to regular flight paths of birds; 90-95% of tern (Sterna spp.) fatalities at a wind energy facility in Belgium resulted from collisions with turbines positioned in a line perpendicular to their flight path between the breeding colony and feeding grounds (Everaert and Stienen 2007). Similarly, wind energy facilities sited along migration pathways may result in more migrant birds being killed than resident birds (Johnson et al. 2002).

Direct mortality also varies by species. Species that forage on the ground are less likely to collide with turbines compared with species that use aerial foraging (Hull et al. 2013). Similarly, aerial foragers that forage within rotor-swept areas and that appear to focus more on prey than on turbine blades are more susceptible to direct mortality than those that exercise caution around turbines (e.g., American Kestrel [Falco sparverius] vs. Northern Harrier [Circus cyaneus]; Smallwood et al. 2009). Also at risk are species that frequently engage with conspecifics during aerial territorial conflicts (e.g., Golden Eagle; Smallwood and Thelander 2008, Smallwood et al. 2009). Collision risk may be further elevated for species with visual fields that may prohibit them from detecting structures (e.g., wind turbines) directly ahead

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of them (e.g., vultures in the genus Gyps; Martin 2011, Martin et al. 2012), or for large species with weakpowered flight and high wing loading that rely on thermals for lift and thus have relatively low maneuverability in flight (e.g., Eurasian Griffon; De Lucas et al. 2008). Vulnerability to turbine collisions may also vary within species for which sex-specific behaviors result in one sex spending more time within rotor-swept areas. For example, heightened foraging activity of male terns during egg-laying and incubation at a wind energy facility in Belgium resulted in male-biased mortality (Stienen et al. 2008). Similarly, song flights performed by male Sky Larks (Alauda arvensis) during the breeding season at a wind energy facility in Portugal increased collision risk, resulting in male-biased mortality (Morinha et al. 2014).

Indirect effects. To date, most studies of indirect effects have focused on the displacement of birds from wind energy facilities. Displacement, typically measured via telemetry or point counts, has been documented for a wide range of taxa including geese (Larsen and Madsen 2000), ducks (Loesch et al. 2013), raptors (Pearce-Higgins et al. 2009, Garvin et al. 2011), grouse (Pearce-Higgins et al. 2012), shorebirds (Pearce-Higgins et al. 2009, 2012, Niemuth et al. 2013), and songbirds (Pearce-Higgins et al. 2009, Stevens et al. 2013). While the mechanisms driving displacement are poorly understood, loss or degradation of habitat may be important, especially for habitat specialists (e.g., Le Conte's Sparrow [Ammodramus leconteii]; Stevens et al. 2013), and may be compounded for species that are sensitive to turbine noise, construction noise, or tall structures (e.g., geese: Larsen and Madsen 2000; raptors: Garvin et al. 2011, Johnston et al. 2014). The latter may be especially relevant in open areas (e.g., grasslands), where species may be sensitive to tall structures, including wind turbines and power poles (e.g., prairie grouse; Hovick et al. 2014). While some species appear sensitive to wind energy development, evidence for the displacement of other species is either minimal or site-specific (e.g., Sky Lark: Devereux et al. 2008; Savannah Sparrow [Passerculus sandwichensis]: Stevens et al. 2013; Montagu's Harrier [Circus pygargus]: Hernández-Pliego et al. 2015; Eastern Meadowlark [Sturnella magna]: Hale et al. 2014), and some species may even be attracted to wind energy facilities (e.g., Killdeer [Charadrius vociferus]; Shaffer and Buhl 2016). Moreover, sensitivity to wind energy development may not always be reflected through changes in spatial ecology, but instead through other behaviors (e.g., lekking; Smith et al. 2016). Birds that avoid wind energy facilities during and immediately following construction may fail to show avoidance behavior thereafter (Madsen and Boertmann 2008, Pearce-Higgins et al. 2012), perhaps minimizing long-term effects in those species. Alternatively, some species may exhibit a delayed response to wind energy facilities, tolerating disturbance immediately following construction, but avoiding the site thereafter (e.g., Grasshopper Sparrow [Ammodramus savannarum]; Shaffer and Buhl 2016).

Wind energy facilities may also indirectly affect breeding performance. For example, distance to a turbine negatively affected nest survival of Greater Sage-Grouse (LeBeau et al. 2014), but had little effect on nest survival of Redwinged Blackbirds (Agelaius phoeniceus; Gillespie and Dinsmore 2014), Greater Prairie-Chickens (McNew et al. 2014, Harrison 2015), and McCown's Longspurs (Rhynchophanes mccownii; Mahoney and Chalfoun 2016). In contrast, Scissor-tailed Flycatchers (Tyrannus forficatus) nesting in sites close to a 75-turbine wind energy facility in Texas had higher nest survival compared with their counterparts nesting in sites farther away (Rubenstahl et al. 2012). Similarly, Hatchett et al. (2013) documented higher nest success for Dickcissels (Spiza americana) nesting near, compared with far from, a wind energy facility in Texas. However, the authors stressed that habitat configuration across the study site, not proximity to turbines, may have underpinned their results.

Wind energy development may also influence adult survival, but, again, effects are likely to be site- and species-specific. For example, annual survival of female Greater Prairie-Chickens increased postconstruction compared with preconstruction of a wind energy facility in Kansas (Winder et al. 2014). In contrast, distance to a turbine did not affect the survival of female Greater Prairie-Chickens breeding along a 25-km gradient at a wind energy facility in Nebraska (J. A. Smith personal observation). Similarly, the survival of female Greater Sage-Grouse breeding in the vicinity of a wind energy facility in Wyoming was unaffected by distance to a turbine (LeBeau et al. 2014).

Despite continuing efforts to assess the indirect effects of wind energy development on birds, the underlying mechanisms are seldom evaluated. For species targeted by brood parasites, a reduction in parasitism rates at wind energy facilities may increase nest success; Blue-gray Gnatcatchers (*Polioptila caerulea*) nesting close to a wind energy facility in Texas had a lower probability of nest parasitism by Brown-headed Cowbirds (*Molothrus ater*) and, subsequently, higher nest success than birds farther away. While it remains unclear why parasitism rates were lower at the wind energy facility, disturbance at the site may have impeded the ability of Brown-headed Cowbirds to detect nests (Bennett et al. 2014).

Changes in predator abundance may be key to understanding the indirect effects of wind energy development on measures of breeding success and adult survival (Rubenstahl et al. 2012, LeBeau et al. 2014, Winder et al. 2014). For example, avoidance of wind energy facilities by raptors (Pearce-Higgins et al. 2009,

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Garvin et al. 2011), or by mammalian predators due to increased disturbance associated with human activity (Gese et al. 1989, Gehrt et al. 2009), may reduce predation risk at sites close to wind energy facilities, consequently increasing survival. Alternatively, the presence of carcasses under wind turbines due to collision-induced mortalities may attract mammalian predators (Smallwood et al. 2010, Rogers et al. 2014), whose presence will, in turn, decrease survival. Despite these expectations, to our knowledge only one study has evaluated predation risk as a possible mechanism underlying survival by simultaneously assessing occupancy of predators and survival of Greater Prairie-Chickens. Site occupancy of avian predators in the vicinity of a wind energy facility in Nebraska was significantly lower within, compared with 2 km beyond, the wind energy facility (J. A. Smith personal observation). In contrast, mammalian predator site occupancy was unaffected. Although no effect was found on the survival of Greater Prairie-Chickens, the study provides evidence of an ecological mechanism that could have important implications for a wide range of species at risk from wind energy development.

The mechanisms underlying displacement or changes in the spatial ecology of birds at wind energy facilities are often discussed, but rarely evaluated. Given that prey species may avoid areas of high predation risk (reviewed by Lima 1998), changes in predator abundance at wind energy facilities (e.g., abundance of raptors; Pearce-Higgins et al. 2009) may be important for elucidating displacement behavior. Similarly, the presence of tall structures (i.e. wind turbines, power poles) at wind energy facilities that provide perches for avian predators may increase perceived predation risk, resulting in avoidance of those sites by potential prey species (e.g., Stevens et al. 2013). Alternatively, species associated with disturbed ground or gravel substrates may be attracted to wind energy facilities through increased opportunities for foraging or nesting (e.g., Killdeer; Shaffer and Buhl 2016), as has been observed at disturbance sites with relatively small footprints associated with other energy sectors (e.g., oil and natural gas developments; Gilbert and Chalfoun 2011, Ludlow et al. 2015). Wind turbines may also create barriers, causing birds to alter their flight patterns to avoid those areas (Drewitt and Langston 2006).

Increasing evidence suggests that birds may be sensitive to anthropogenic noise, and that noise from traffic, roads, aircraft, and energy infrastructure could disrupt acoustic communication through masking (Ortega 2012). In response to anthropogenic noise, birds may alter the characteristics of their vocalizations to compensate for masking (e.g., Hu and Cardoso 2010, Francis et al. 2012), or they may show behavioral avoidance (Bayne et al. 2008, Blickley et al. 2012, McClure et al. 2013). Recent research suggests that low-frequency noise produced by wind

turbines may disrupt acoustic communication, causing birds to modify their vocalization characteristics (Whalen 2015, Zwart et al. 2016b). These results suggest that noise associated with wind energy development may disturb birds and could act as a mechanism driving indirect effects (e.g., lekking behavior; Smith et al. 2016). However, the likelihood of noise as an intermediary mechanism is likely to be species-specific, depending on the extent of masking (Rheindt 2003).

Solar Energy

Direct effects. Because solar energy development can occur in areas of high endemism (e.g., the deserts of the southwestern U.S.), the potential impacts on bird populations are substantial (Lovich and Ennen 2011). Yet, to our knowledge, only 1 peer-reviewed study of direct impacts exists: McCrary et al. (1986) concluded that the risk of collision with infrastructure at a solar energy facility in the Mojave Desert, California, was low after documenting 70 mortalities of 26 bird species over a 40-week period. The facility consisted of mirrors (heliostats) that concentrated solar energy onto a centrally located tower where liquid was converted to steam to generate electricity (hereafter 'solar tower'). More recent preliminary evaluations across 3 different solar energy facilities in southern California suggest that direct impacts are greater than previously thought (Kagan et al. 2014), and that installation design also affects risk. Kagan et al. (2014) considered 3 quite different installations: solar towers; photovoltaic cells that convert solar energy directly into electricity; and parabolic troughs consisting of mirrors that reflect solar energy onto a receiver tube within the trough which transports heated fluid to generate electricity. Opportunistic collection of carcasses at the 3 facilities suggested that mortality rates were higher at solar towers compared with parabolic troughs or photovoltaic cells. However, given the lack of information regarding fatalities at solar energy facilities, conclusive estimates of mortalities associated with solar energy facilities cannot be established (Loss et al. 2015).

Two main causes of death have been identified across solar energy facilities: impact trauma and exposure to concentrated solar energy (heat) at solar tower facilities (hereafter, solar flux'; Kagan et al. 2014). In common with other anthropogenic structures, all types of solar energy facilities may result in deaths of birds through impact trauma; solar flux trauma is unique to solar tower facilities. By damaging feathers (sometimes severely) when birds fly through areas of concentrated heat near the tower, solar flux can hinder a bird's ability to fly, induce shock, and damage soft tissue (Kagan et al. 2014). By impairing flight, solar flux trauma may increase the risk of direct collision with infrastructure or the ground, or may reduce a bird's ability to forage or evade predators.

Carcasses from a wide range of taxa have been identified at solar energy facilities (e.g., ducks, wading birds, raptors,

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rails, shorebirds, and songbirds; McCrary et al. 1986, Kagan et al. 2014). The mortality of an individual of the federally endangered subspecies of Ridgway's Rail (Rallus obsoletus yumanensis) suggests that solar energy facilities may have important consequences for species of conservation concern. While it appears that many species may be at risk, relatively high numbers of waterbird carcasses at photovoltaic cell facilities suggest that waterbirds may be particularly at risk where infrastructure (i.e. photovoltaic cells) reflects polarized light, giving the impression of water (Horváth et al. 2009, 2010). The water retention ponds needed at solar tower facilities may exacerbate risk by attracting birds to solar energy facilities, especially in arid landscapes (McCrary et al. 1986, Kagan et al. 2014). Insects that are apparently attracted to solar tower facilities may underlie the large number of aerial insectivores affected by solar flux (Hováth et al. 2010, Kagan et al. 2014), emphasizing the complex ecological processes that may contribute to risks to birds. While the mechanisms underlying mortality events are sometimes unclear, evidence indicating that solar energy facilities could be ecological traps (Schlaepfer et al. 2002) has begun to accrue.

Indirect effects. To our knowledge, only 1 peerreviewed study has evaluated the indirect effects of solar energy development on birds. DeVault et al. (2014) demonstrated that solar photovoltaic facilities could potentially alter bird communities: In 5 locations across the U.S., species diversity was lower at photovoltaic array sites than in adjacent grasslands (37 vs. 46 species, respectively). In contrast, bird densities at the same photovoltaic array sites were more than twice those of adjacent grasslands. Observations during the study suggested that shade and the provision of perches increased bird use of the photovoltaic array sites. However, the results were species specific, with some small songbird species (e.g., American Robin [Turdus migratorius]) more abundant at photovoltaic facilities compared with adjacent grasslands used for habitat comparisons, but corvids and raptors less abundant. Similarly, raptor abundance was higher preconstruction compared with postconstruction of a utility-scale solar energy facility in south-central California, suggesting avoidance of the facility. In comparison, ravens and icterids increased in abundance during construction, possibly as a result of increased foraging opportunities at disturbed sites (J. Smith personal

Similarly to the effects of wind energy development and other onshore energy development (e.g., oil and natural gas development; Kalyn Bogard and Davis 2014, Bayne et al. 2016), the potential indirect effects of solar energy facilities on birds are likely site-specific. For example, given that the footprint and configuration of solar energy facilities vary with the technology used (e.g., photovoltaic facilities are typically larger than solar tower sites; Hernandez et al.

2014a), indirect effects mediated through habitat loss or barrier effects are likely dependent on site-specific infrastructure (Hernandez et al. 2014b). Solar energy facilities may also disrupt local hydrology through groundwater extraction or channelization, which could reduce both food and habitat availability for birds (Grippo et al. 2015). Such effects are likely amplified at sites where footprints are large and at facilities that consume large volumes of groundwater (e.g., parabolic troughs and solar towers; Hernandez et al. 2014b, Grippo et al. 2015). The potential for contaminant runoff to indirectly affect birds also may be elevated at sites with large footprints (Grippo et al. 2015). Variation in other disturbances (e.g., vehicular traffic, construction noise, and operations) among sites could also contribute to site-specific variation in indirect effects (Lovich and Ennen 2011); we encourage further exploration of these factors.

Power Lines

Renewable energy facilities often require the construction of new transmission lines to deliver the energy produced at the facility to the existing power line network. These permanent connections may include many kilometers of lines supported by towers 30-35 m tall, and can traverse habitats beyond the line of sight from either the renewable energy facility or from a center of energy consumption. This is particularly true after ideal siting locations close to existing lines have been developed; subsequently constructed renewable energy facilities can be increasingly distant from the existing transmission line network, requiring increasingly longer connections. Transmission lines are associated with collision mortalities of flying birds (Rogers et al. 2014, Lobermeier et al. 2015; but see Luzenski et al. 2016), but renewable energy connections can be overlooked when investigating direct and indirect effects of renewable energy facilities.

Direct effects. Avian interactions with transmission lines appear to affect populations primarily through direct mortality, although indirect effects of habitat fragmentation have been hypothesized. Direct collision mortality is an ongoing concern in many areas of the U.S. (Yee 2008, Sporer et al. 2013, Luzenski et al. 2016). Collisions are most often associated with aquatic habitats, where species with high wing loading, high flight speeds, and poor maneuverability are common (Shaw et al. 2010, Quinn et al. 2011, Barrientos et al. 2012). Large, heavy-bodied species such as swans, pelicans, herons, and cranes are generally thought to be more susceptible to transmission line collisions than smaller, more maneuverable species (APLIC 2012). Nocturnal migrants have not been well studied, but also may be susceptible, particularly within migration corridors (Rogers et al. 2014), and especially in light of their susceptibility to collision with other types of tall anthropogenic structures (Drewitt and Langston 2008,

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Kerlinger et al. 2010, Gehring et al. 2011). Relatively small duck and grouse species are also vulnerable to collision because of their high flight speed, low altitude, and flocking flight, in which the view of upcoming obstacles is obscured by leading birds (APLIC 1994, Bevanger and Brøseth 2004). Transmission lines bisecting daily movement corridors, such as those located between roosting and foraging sites, have been most associated with avian collisions (Bevanger and Brøseth 2004, Stehn and Wassenich 2008, APLIC 2012), with risk exacerbated during low light, fog, and other inclement weather conditions (Savereno et al. 1996, APLIC 2012, Hüppop and Hilgerloh 2012). Transmission lines are typically constructed with relatively thin overhead shield wires at the top, and thicker energized conductors below. Birds appear to see energized conductors and adjust flight altitudes upward to avoid them, subsequently colliding with smaller, less visible overhead shield wires (Murphy et al. 2009, Ventana Wildlife Society 2009, Martin and Shaw 2010). Collision risk may be further exacerbated for species with narrower fields of view (Martin and Shaw 2010), but this remains an important research gap because to date it has been thoroughly studied only in Kori Bustards (Ardeotis kori), Blue Cranes (Grus paradisea), and White Storks (Ciconia ciconia), which are large, collision-prone species. Collision risk may be mitigated in migrating raptors, which tend to fly diurnally during good weather (Ligouri 2005) and appear to detect and avoid transmission lines, even those located in major migration corridors (Luzenski et al. 2016).

Indirect effects. The indirect effects of transmission lines are not well studied. Of the existing studies that have addressed indirect effects, most have considered grouse (Lammers et al. 2007, Coates et al. 2008, Coates and Delehanty 2010) or desert tortoises (Gopherus agassizii; Boarman 2003, Berry et al. 2013), species of conservation concern potentially preyed upon by corvids and raptors using utility structures as hunting perches. As power lines have proliferated, at least some corvid species appear to have expanded their breeding ranges (Jerzak 2001, Marzluff and Neatherlin 2006, Dwyer et al. 2013a) or increased their breeding densities (Coates et al. 2014) through utilizing power poles for nesting (Fleischer et al. 2008, Howe et al. 2014, Dwyer et al. 2015), possibly leading to indirect effects on their prey. Recent research suggests that avoidance by reindeer (Rangifer tarandus) may be linked to their ability to detect ultraviolet (UV) light emitted by transmission lines (Tyler et al. 2014). At least some birds also see in the UV spectrum (Lind et al. 2014), but the potential implications of this for indirect effects have not been thoroughly investigated.

SYNTHESIS AND SITING GUIDELINES

Our review summarizes existing studies of direct and indirect effects of energy infrastructure associated with 2

expanding energy sectors (onshore wind and solar), and indicates ongoing concern about the transmission lines connecting these facilities to existing electric transmission lines. This overview demonstrates that both the magnitude and the mechanisms of direct and indirect effects of renewable energy infrastructure and the associated power lines on birds are site- and species-specific (e.g., Villegas-Patraca et al. 2012, DeVault et al. 2014, Bayne et al. 2016). However, while we have provided comprehensive coverage of existing peer-reviewed literature, we stress that existing gray literature, much of which is held by private energy companies, would likely shed additional light on the direct and indirect effects of renewable energy infrastructures. Thus, increased public availability of privately funded data is urgently needed (Loss 2016).

Despite highlighting the prevalence of both site- and species-specific effects, some generalities can be drawn from our review. Large-bodied species with weakly powered flight, high wing loading, and relatively low maneuverability appear to be especially susceptible to the direct effects of tall structures at energy facilities (e.g., wind turbines and power poles). This is of concern, given that the sensitivity of such species at the population level is likely high because of delayed maturity and low reproductive rates (Dahl et al. 2012, Lovich 2015, Loss 2016). The effects of placement appear to be important across all energy infrastructure types considered in this review; infrastructure that bisects regular daily or migratory flight paths (e.g., turbine lines, transmission lines) may disproportionately affect birds compared with structures sited outside regular flight paths. The placement of infrastructure in habitat with few natural tall perches (deserts, grasslands, sagebrush steppe) may be more disruptive to the overall ecology of an area than the placement of infrastructure in habitat previously characterized by natural tall structures (forests), but further research is needed to explore these expectations. Given that all infrastructure results in direct habitat loss, indirect effects that act through the loss or fragmentation of habitat are likely to occur across all energy sectors. Similarly, given the potential for energy infrastructure and power lines to affect the distribution of predators, predation may be an important mechanism underlying indirect effects across energy facilities.

When considered together, the direct and indirect effects at renewable energy facilities and the transmission lines serving those facilities are likely cumulative and could be synergistic, especially when facilities are poorly sited (e.g., in areas of high bird abundance, in regular flight paths, or where facilities could act as ecological traps). However, the magnitude of direct effects is likely far less for energy facilities compared with other anthropogenic mortality sources in the U.S. (e.g., cats, buildings, communication towers, and automobiles; Loss et al. 2015), and the indirect effects of wind energy facilities may be less than those of traditional energy infrastructure

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(Hovick et al. 2014). Nevertheless, the potential for additional effects of other infrastructure at energy facilities could further increase direct and indirect effects within an energy facility's footprint (e.g., roads: Benítez-López et al. 2010; maintenance buildings: Loss et al. 2014).

A critical end-goal for research in this field is to integrate research findings into mitigation strategies and to inform siting guidelines. Given the site- and speciesspecific nature of the effects of the energy infrastructure reviewed here, siting guidelines should be carefully developed in the context of vulnerable species within a particular geographic area. However, some key generalities have emerged that should be considered during siting decisions. We suggest the following: (1) Avoiding areas of high bird use (e.g., regularly used flight paths, migration corridors, and aggregation areas); (2) Avoiding areas inhabited by sensitive species or those of conservation concern; (3) Avoiding topographical features that promote foraging or that are used by migrating birds for uplift (e.g., the tops of slopes; Kitano and Shiraki 2013); (4) Avoiding areas of high biodiversity, endemism, and ecological sensitivity; (5) Developing conservation buffers for vulnerable species based on thresholds determined through empirical research; (6) Carefully selecting or modifying infrastructure to minimize collision risk or indirect effects (e.g., by the use of flashing red lights and ground devices, or by employing efficient technology that uses less space; Kerlinger et al. 2010, Martin 2012); and (7) Curtailing turbine operation under certain conditions (e.g., fog in the presence of sensitive species).

We also encourage the use of predictive models to gauge likely impacts at sites (e.g., Shaw et al. 2010, Dwyer et al. 2013b), and encourage the development and use of spatially explicit sensitivity maps that incorporate the distribution of bird populations, key flight paths, habitats, and risk factors (e.g., Bright et al. 2008, Dwyer et al. 2016, Pearse et al. 2016).

CONSIDERATIONS FOR FUTURE RESEARCH

The expected trajectory of the renewable energy sector (both in size and in technological advances) will expand the geographic area and, thus, habitats impacted by development. Much research to date has focused on wind energy development in grassland habitats in the Great Plains (e.g., LeBeau et al. 2014, Harrison 2015, Winder et al. 2015) and, to a lesser extent, solar energy development in the deserts of the southwestern U.S. (McCrary et al. 1986, Kagan et al. 2014). However, interactions between renewable energy infrastructure and birds are likely different among habitats (e.g., grasslands vs. woodlands), and thus continued habitat-specific research is needed. Because the effects of energy infrastructure on birds may vary with stage of operation (e.g., during construction,

immediately following construction, and >1 yr postconstruction; Madsen and Boertmann 2008, Pearce-Higgins et al. 2012, Shaffer and Buhl 2016), such studies should be conducted over an extended period (e.g., 5, 10, or 15 yr). Studies that enable researchers to separate the effects of different infrastructure at facilities (e.g., roads, buildings, and wind turbines) are also encouraged. Given that wind energy infrastructure is also associated with bat collisions (e.g., Doty and Martin 2013), future research should seek to integrate avian and bat monitoring to identify cumulative effects.

Understanding the mechanisms that underlie the indirect effects of energy infrastructure on birds is essential if we are to establish conservation strategies that minimize potential impacts. While efforts have been made to address these concerns (Whalen 2015, J. A. Smith personal observation), the mechanistic drivers of effects are likely to vary with infrastructure type and across sites. Therefore, we encourage researchers to adopt mechanistic approaches in future studies of indirect effects by designing studies to reveal important mechanisms. Mechanisms could include, but are not limited to, changes in predation risk, food availability, and habitat availability, and avoidance of physical structures, lights, and UV light. Given that anthropogenic noise may disturb birds (Slabbekoorn and Ripmeester 2007, Blickley et al. 2012), we suggest that studies of energy development and avian interactions consider the role that infrastructure noise plays in driving indirect effects. Studies of solar facilities should explore the mechanisms resulting in avian concentrations at photovoltaic arrays (e.g., polarized light; Hováth et al.

Given that siting guidelines are often concerned with threshold distances (i.e. the distances from energy facilities at which effects on target species become negligible), we stress the relevance of using a gradient approach in studies of avian and energy infrastructure interactions. For example, by evaluating impacts on target populations at various distances from energy facilities, threshold distances can be identified and used to develop biologically meaningful conservation buffers. Such approaches have proven valuable in studies of disturbance associated with roads, urban areas, and oil and gas development (e.g., Reijnen et al. 1997, Laurance 2004, Palomino et al. 2007), and should be integrated into studies of renewable energy infrastructure (e.g., Winder et al. 2014, Harrison 2015, Whalen 2015). By centering buffers on sensitive habitat patches or populations, areas where development should be avoided can be delineated. However, we note that the effects of energy infrastructure may not always be detected via a gradient approach. Instead, the intensity of development (e.g., density of wind turbines) may be more informative (Mahoney and Chalfoun 2016). When possible, we also encourage implementation of a Before-After-

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Control-Impact (BACI) study design that allows comparison of preconstruction, postconstruction, and control data, or, better still, an Impact-Gradient-Design (IGD) study design that incorporates the properties of both a gradient approach and a BACI study design. When preconstruction data is not available, control sites away from the focal energy facility should be considered. Researchers should also consider the specific biology (e.g., spatial ecology, life-history strategy) of the focal species, or focal populations, to sample suitable control sites.

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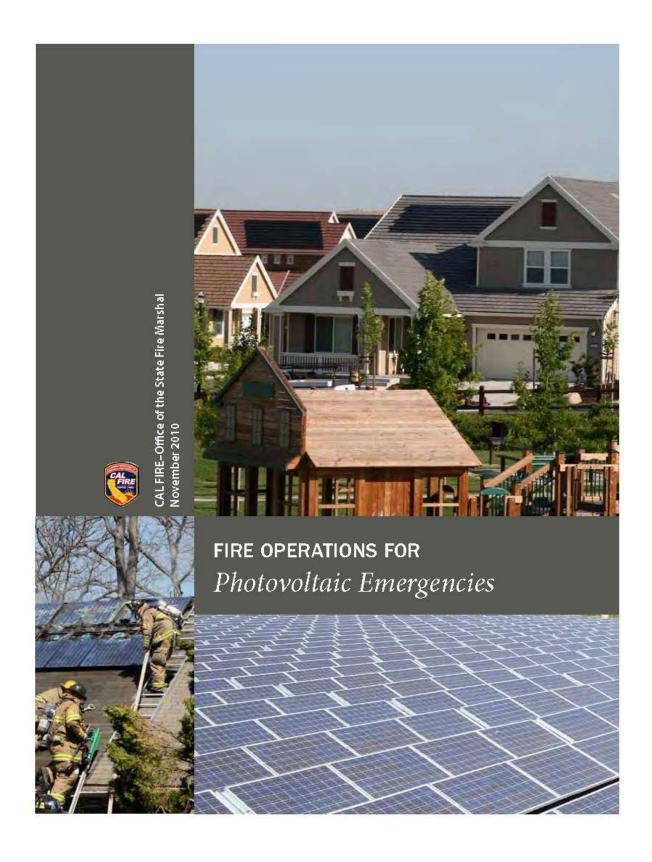
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EXHIBIT 8



0.2-102 | January 2023 County of Imperial



CAL FIRE-Office of the State Fire Marshal November 2010



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Photovoltaic Emergencies

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MISSION STATEMENT

The mission of State Fire Training is to enable the California fire service to safely protect life and property through education, training, and certification.

FIRE SERVICE TRAINING AND EDUCATION PROGRAM

The Fire Service Training and Education Program (FSTEP), was established to provide specific training needs of local fire agencies in California. State Fire Training coordinates the delivery of this training through the use of approved curricula and registered instructors.

The FSTEP series is designed to provide both the volunteer and career fire fighter with hands-on training in specialized areas such as fire fighting, extrication, rescue, and pump operations. All courses are delivered through registered instructors and can be tailored by the instructor to meet your department's specific need. Upon successful completion of an approved FSTEP course, participants will receive an Office of the State Fire Marshal course completion certificate.

ACKNOWLEDGMENTS

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Lester A. Snow, Natural Resources Agency Secretary

Del Walters, CAL FIRE Director

Tonya Hoover, Acting State Fire Marshal

Michael Richwine, Chief, State Fire Training

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Rodney Slaughter, Deputy State Fire Marshal

Tammara Askea, Graphic Design

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Course Outline Course Objectives: At the conclusion of this class the student will... Have a working knowledge of a Photovoltaic System Be able to identify component parts of a Photovoltaic System b) c) Identify and mitigate potential hazards d) Identify occupancies and locations for Photovoltaic Systems e) Perform size-up and develop response strategies and tactics **Course Content** 8:00* 1. Introduction 0:30 2. Photovoltaic history, distribution and regulation 1:00 3. Photovoltaic components; modules, wiring and inverters 1:00 4. Photovoltaic operation and tactical considerations 2:00 5. Residential and suburban applications 1:00 6. Large and small commercial applications 1:00 7. Battery hazards for off-grid systems 1:00 8. Photovoltaic technologies underdevelopment 0:30 *Minimum course hours = 8. If the optional skills and evolutions are scheduled to be taught, adequate time and materials must be added. REFERENCES Callan, Michael, "Responding To Utility Emergencies: A Street Smart Approach to Understanding and handling Electrical and Utility Gas Emergencies", 1st Edition, Red Hat Publishing, 2004. Grant, Casey, "Fire Fighter Safety and Emergency Response for Solar Power Systems," NFPA, Fire Protection Research Foundation, Quincy MA, May 2010 Slaughter, Rodney, "Fundamentals of Photovoltaics for the Fire Service", Dragonfly Communications Network, Corning, CA, September 2006. U.S. Fire Administration, "Firefighter Fatalities in the United States in 1999," National Fire Data Center, July 2000.

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SECTION 1 | PHOTOVOLTAICS

Terminal Objective

At the conclusion of this module students will be able to recognize types of photovoltaic systems and components

Enabling Objective

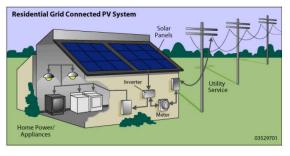
The student will be able to:

- Describe a photovoltaic system
- Identify system components

1.1 INTRODUCTION

With a variety of alternative electrical generation systems available, none is becoming more prevalent than those which convert solar energy to electricity. These systems are known as photovoltaic systems, or simply PV. A photovoltaic system consists of photovoltaic solar panels and other electrical components used to capture solar energy and convert it to electrical power. Many systems are roof mounted and may present hazards to firefighting operations. Firefighters can be sure that at some point in the future they will encounter an incident involving a building with a solar electric generating system.

PV systems are an economical and environmentally clean way to generate electricity and are here to stay. Your fundamental understanding of PV systems will increase your confidence when fighting fires involving PV equipment and when fighting fires in structures equipped with PV systems. The PV industry, utility companies, manufacturers, suppliers, regulators, designers and installers are working with fire service to ensure that firefighters will be able to operate safely around PV systems.



The days of firefighters rushing in to a structure without first making an assessment and size-up of the emergency have passed. In addition to a several other hazards found in fighting fire in modern buildings, Fire fighters must also be aware of PV systems and the associated hazards. The potential hazards, which will be discussed in this curriculum include, electrical shock, trip/slip/fall, increased roof loads, hazardous materials, and battery storage hazards. This training curriculum will review these dangers and hazards as well as make recommendations on how you can protect your fire crew members and yourself.

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The information contained in this curriculum is specific to California. If used in other states or countries, some of the discussion should be updated to reflect local energy policies and regulations.



1.2 WHAT ARE PHOTOVOLTAICS?

"Photovoltaics" refers to the process of converting energy in the form of light from the sun to usable electrical current. A PV system refers to a system of components that, together, will generate electricity for use on site and may allow excess electricity to flow to the utility grid.

Since the 1980s, solar electricity has been used in many common household devices. You probably remember the early solar-powered calculators that didn't need a battery and small solar charging systems for recreational vehicles and boats. But this was just the beginning. The solar electric industry is now actively selling and installing PV systems throughout California. At the end of 2009, there were approximately

50,000 individual solar projects scattered throughout California on residential and commercial properties. Residential systems can create enough electricity to meet a home's entire annual energy needs. There are also thousands of solar thermal systems in California, which are used to provide hot water and home heating. This curriculum does not cover solar thermal water heating systems.



Everyday solar electricity can be found in bookbags, solar calculators, and landscape lighting.

There are a variety of PV types and installations, but generally a PV system includes:

- Modules: Modules, also called panels, are made up of many round or square cells, which create electricity when exposed to sunlight. The cells are connected together using materials that allow the electrons to flow into a system of electrical connections.
 - allow the electrons to flow into a system of electrical connections.

 A group of modules is called a 'string' and a group of strings is called an 'array.'
- Wiring harness: Wiring harnesses are used to wire modules together in series. A group of strings are connected together at a junction called a combiner box. From the junction box(s) conductors carry the electricity to the inverter.

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- * Inverter: PV panels produce direct current which generally needs to be converted to alternating current. This is done by an inverter. The inverter is connected to the on-site utility service panel, so that electricity from the solar array can provide electricity to the site.
- **Batteries:** Batteries are used in "banks" store electricity.
- **Disconnect Switches:** A PV system may have one or more disconnect switches between the arrays and the electrical service panel.

In other than off-grid systems, most PV systems installed today do not use batteries. Instead, the systems produce electricity for use on site or for transmission to the local utility. When more electricity is produced from the solar panels than is needed on site, the extra electricity is allowed to flow into the utility system. The surplus current runs through a meter that measures how much of electricity flows into the utility grid. The elimination of batteries has reduced the cost and increased the practicality of PV systems thereby allowing PV to be more available to consumers.

1.3 STATE SAFETY REGULATIONS

Regulations in the National Electrical Code addressing solar electrical safety have been in place since the 1980s. As PV technology has evolved, so have the applicable codes and ordinances. Like all evolving technologies, practical experience plays an important role in the development of new regulations.

In 2007, the California Office of the State Fire Marshal (CAL FIRE) established a task force that included representatives from the fire service, building officials, other state agencies, and the PV industry in order to develop a guideline for the installation of PV systems. The Solar Photovoltaic Installation Guideline was developed to provide local jurisdictions and the solar industry with information for the layout, design, marking, and installation of solar photovoltaic systems. The Guideline can be located on-line at http://osfm.fire.ca.gov/training/photovoltaics.php and is intended to mitigate the fire and life safety issues. In addition, the Guideline provides labeling recommendations to help the fire service identify the components of the PV system at the scene of a fire. In May 2010, the International Code Council adopted a version of the California Guideline into the 2012 International Fire Code.

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1.4 NUMBER OF PV SYSTEMS IN CALIFORNIA

Changes in PV technology, such as efficiency and availability have lowered the price of PV systems. As a result, the number of solar installations has increased dramatically. Figure 1 shows a chart of the number of solar projects installed between 2001 and 2009 in the regions served by Pacific Gas & Electric (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric (SDG&E). Table 1 shows the actual numbers in these same utility areas.

12000 10000 8000 6000 ■ SDG&E ■ SCE 4000 2000 2002 2003 2004 2005 2006 2007 2008 2009 thru 2001

Figure 1: Number of solar projects in California, 2001-2009

Table 1: Number of PV Projects by Utility Area

Utility Area	thru 2001	2002	2003	2004	2005	2006	2007	2008	2009
SCE	294	446	801	939	807	1344	1873	2352	2769
SDG&E	306	350	53 <i>7</i>	861	934	961	1028	951	1658
PG&E	745	1243	1856	3104	2824	4348	6578	6547	6607
Total	1345	2039	3194	4904	4565	6653	9479	9850	11034

Even though incentives are available statewide, most PV projects are installed in areas where electricity use and rates are high. Typically, these are areas in which the use of air conditioning is highest. Utilities in California use a tiered billing system; the rate paid for electricity by the consumer is higher based upon the quantity of electricity used. However, some customers choose to install PV systems simply out of concern for the environment or climate change.



Table 2 shows the Cities and Counties with the most Residential PV systems installed between 2007 and February 2009.

Table 2: Residential PV Systems in Cities and Counties, January 2007-February 2009¹

Counties	Cities
San Diego 3,098 (12.1%)	San Diego: 1,095 (4.3%)
Santa Clara: 2,291 (9.0%)	San Francisco: 1,012 (4.0%)
Los Angeles: 2,191 (8.6%)	San Jose: 851 (3.3%)
Alameda: 1,465 (5.7%)	Fresno: 540 (2.1%)
Contra Costa: 1,175 (4.6%)	Clovis: 389 (1.5%)
Sonoma: 1119 (4.4%)	Santa Rosa: 368 (1.4%)
Riverside: 1101 (4.3%)	Oakland: 301 (1.2%)
Fresno: 1089 (4.3%)	Berkeley: 294 (1.2%)
San Francisco: 1,013 (4.0%)	Santa Cruz: 291 (1.1%)
Other/Unspecified: 9,609 (37.6%)	Other/Unspecified: 19,997 (78.2%)

To obtain more recent statistics on solar projects constructed in California Cities and Counties, visit www.californiasolarstatistics.ca.gov.

Some communities provide on line solar maps, showing where solar projects have been installed in their communities. Table 3 shows a list of a few of the solar maps available in California.

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 $^{^{1}}$ Source: www.californiasolarstatistics.ca.gov

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Table 3: Solar Map Websites

City	Website
San Francisco	http://sf.solarmap.org/
Los Angeles	http://solarmap.lacounty.gov/
San Diego	http://sd.solarmap.org/solar/index.php
Berkeley	http://berkeley.solarmap.org/solarmap_v4.html
Sacramento	http://smud.solarmap.org/map.html
San Jose	http://www.sanjoseca.gov/esd/energy/svenergymap.asp

1.5 INCIDENT SUMMARY

As the number of PV systems has increased, fire service experience with theses systems has also grown. In addition, the fire service has experienced several fires involving buildings equipped with PV and fires involving the PV components. These experiences have not resulted in death or serious injury to firefighters but they have highlighted the need for the solar industry to work with the fire service.

Table 3 shows a brief summary of incidents that have been reported. Lessons learned from these incidents will be used in case studies and examples in this training material.



A content fire in the garage of this residence destroyed the PV inverter box.

Table 4: Incident Summary

Date	Location	Summary
June 1996	Grassy Area	Small grass fire originating from PV modules.
2003	San Bernardino (De- vore, CA)	Residential wildfire in the region. Building and PV system survived (all other buildings destroyed)
2004	Strip Mall	Overheated junction box with smoke and no fire.
Feb 2008	Long Beach, CA	Convention center fire on two modules. The modules involved were field repaired by the manufacturer representative. Damage limited to the modules.
June 2008	Sedona AZ	Residential content fire. PV system was destroyed. Firefighter re- ceived an electric shock (non life threatening) that was first attribut- ed to the PV system but later attributed to the utility power supply.
May 2008	San Prancisco, CA	University of San Francisco fire started at the array and extinguished by maintenance personnel.
Jan 2009	Топтапсе, СА	Residential fire started at PV modules 2 weeks after the system was installed. The modules were 'do-it-yourself' of questionable installation quality.

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June 2009	Concord, CA	Concord CA- Residential Garage fire. PV system not involved and did not burn (although inverter was destroyed because of the extent of the fire. The PV system did not cause the fire.
Mar 2009	Simi Valley, CA	Residential fire started in a shingle module of an integrated roof PV system.
Apr 2009	Bakersfield, CA	Big Box retail store fire may have started in the PV conduitor the array.
Summer 2009	San Francisco, CA	Convention Center incident. PV Modules observed arcing. No fire occurred. Modules replaced.
Summer 2009	Davis, CA	Grass fire at PV USA a former PV research center.
June 2009	Bursdadt, Germany	Large warehouse. Fire occurred at the PV modules (200 square feet of a 5 MW system) within the array.
Jan 2010	Minne sota	A chimney fire that was originally attributed to near by roof-mount- ed air heating panels but later corrected.
Mar 2010	Victorville, CA	Concentrating modules burned while stored on site before instal- lation took place. Fire likely caused by a cigarette or other burning material that came in contact with the boxes where the modules were stored.
Apr 2010	Maryland	Residential fire—Older PV system. Fire started at modules. Reports are debris beneath modules may have been involved in the cause of the fire.
Apr 2010	San Diego, CA	Residential fire on an 8 year old, self-installed PV system, started at the inverter. PV modules not involved. The lack of an external DC disconnect, prevented resident and emergency responders from turning off power from the modules.
May 2010	Fresno	A Fig. sno College campus a fire occurred in the combiner box of a PV system, mounted on a parking structure.



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This brief summary of PV incidents chronicles a range of issues that are associated with PV. But this review reveals that some of these problems did not start with the PV system, but from inexperienced installations, installations using damaged panels, and incidents that occurred before the PV system was actually installed. Importantly, some of these incidents started as a result of overheated arrays and junction boxes. While some PV systems were involved with a structural fire, they were not the origin of the fire. In all cases, developing a fundamental understanding of PV systems will help you stay safe when operating around the system and help you mitigate potential emergencies.







Bach cell of a PV module is wired together to the junction box on the back side of the module. The picture, lower left, shows the damage to the junction box after it becomes overheated.

SECTION 2: PHOTOVOLTAIC CELLS AND COMPONENTS

Terminal Objective

At the conclusion of this module students will have knowledge of the basic parts of a PV system.

Enabling Objective

The student will be able to:

- · Describe the basic parts of a PV panel
- Identify system components
- · Understand basic design considerations

2.1 INTRODUCTION

Photovoltaics begin at the source—the Sun! Every day enough solar energy falls on the earth to supply all the world's energy needs for four to five years. The Sun's full intensity and brightness, often called "peak sun", is 1,000 watts per square meter (referred to as irradiance). This intensity can be diminished by the micro dimate and site specific conditions, such as weather and shade. But even on overcast days caused by smog or

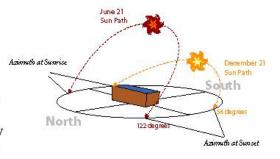
clouds, solar electricity can still be generated by the solar panels, although at

significantly reduced efficiency.

The sun produces the most energy between 9 am and 3 pm. To maximize their efficiency, most PV systems in the Northern Hemisphere are orientated toward the south. Understanding how solar cells generate electricity is one thing. Understanding what to do with all that electricity is another. In many cases, a PV system will generate more electricity during the sunniest part of the day than can be used at the time.

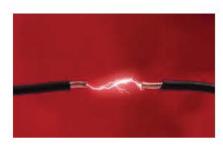
The main point that a firefighter needs to have about PV electrical generation is that the amount of current generated depends on how intense the sunlight is. If the sunlight doubles in intensity, the current generated by the array will also double.

The current is not unlimited as with energy supplied by a utility service. For a utility service, a short circuit can generate 10,000 amps at a residence to 100,000 amps at a large commercial facility. These high short-circuit currents at utility services are a severe hazard to the firefighter. PV systems, on the other hand, are limited by the presence of sunlight. A large residential PV system might have 30 amps of short circuit current at full sun (compared to the 10,000 amps of utility supplied current), and a large commercial PV array may have 1,500 amps of available short circuit current



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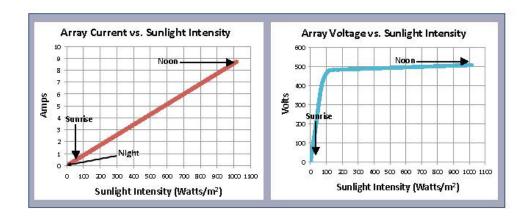
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(compared to the 100,000 amps of utility supplied current). What this means for firefighters is that there is a significant difference in the hazard for arc flashes and arc burns between utility supplied current versus PV generated current. However, it does not mean that the PV electrical power is completely safe. It still poses many of the electrocution hazards that are discussed in this training.

Another important consideration for firefighters is that the voltage is very consistent during daylight hours. As soon as the sky is light and it is possible to easily see outdoors without artificial light, the voltage on a PV array will rise to the voltage it will operate at throughout the day.

Although current (amperage) is what causes damage to a person's body, the voltage is what drives that current through the body. The higher the voltage, the higher the amount of current is forced through the body in an electrical shock. The simple rule is that if it is possible to see outdoors easily without the need for artificial light, then the PV array is generating dangerous voltage.



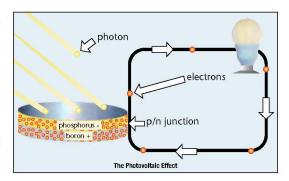
Photovoltaic designers have several options in regard to the fluctuation of energy throughout the day:

- * Store excess electricity in a bank of batteries so that the electricity can be used when the sun is not shining. This design is typical of an off-grid system.
- Credit excess electricity generated back to the utility company. This is typical of a grid-tied system.
- * Store electricity in the battery bank and credit excess electricity back to the utility grid. This battery back-up system ensures that the building owner will have enough electricity stored in case of a utility grid power outage (While battery back-up systems do exist, they are not common in the urban setting).

2.2 ANATOMY OF A SOLAR CELL

The individual solar cell is the smallest unit and the foundation of the PV system. There are two common types of PV cells: silicon and amorphous silicon. In both cases, a very thin slice

of the semi -conductor silicon (about 1/100th of an inch thick) is layered along with boron and phosphorous in a process known as "doping". Boron, which is used for the positive layer of the cell, has an electron deficiency. Boron has room, or a hole, in the outer shell of the atom to add an electron. Phosphorus has an extra electron and is used for the negative layer of the solar cell. Photons from the sun energize and knock loose the extra electron in the negative layer which crosses the positive-negative (P-N) junction to fill the hole on the positive Boron side. This process generates approximately 0.5 volts per cell.



The composition of the silicon crystalline structure varies from manufacturer to manufacturer. The purest silicon structure employs the growth of a single crystal (monocrystalline) cut in to thin wafers. Multiple crystals cast together and sliced into thin wafers form polycrystalline structure seen in many solar panels.

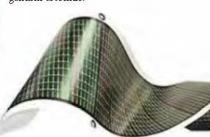
All PV modules are made with multiple cells. However, some solar cells look very different from the squared crystalline silicon cells that are most common. Thin film semiconductors can be made from silicon, or other special semiconductors. These cells are most often organized in thin long lines on a PV module from $\frac{1}{4}$ " to $\frac{3}{4}$ " in width.

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There are many semiconductor technologies being employed to improve PV efficiency and to reduce production cost. The industry is using and experimenting with many other materials such as thin films like cadmium telluride and high efficiency multi-junction cells that use gallium arsenide.





As stated elsewhere in this training, artificial light alone, in the form of scene lighting for nighttime operations, is insufficient to create dangerous current. PV cells may, however, generate miniscule amounts of electricity at night. In a recent study at the Sacramento Municipal Utility District, the Sacramento Fire District participated in an experiment to measure the amount of electricity generated at night or when exposed to emergency lighting systems. The results of this test are shown in Table 5.

Table 5: Results of Night Test, September 2007

			Foot Car				
Test	Distance (ft)	Height (ft)	Tungsten	Mercury	Halogen	Volts	Amps
1	57	8				70	0.002
2	57	0	200			53	0.003
3	46	0	35	37	33	78	0,004
4	41	8	34	33.9	30.6	83.6	0.003
5	15	8	160	150	145	235	0.034

2.3 PHOTOVOLTAIC MODULES

Solar cells are encapsulated together within an anti-reflective glass and a plastic back cover. An aluminum frame typically protects the edge of the glass and provides a good mounting structure to fasten the module to a support structure.

When several cells are connected together in series and parallel the voltage and amperage is increased to achieve the desired electrical output. Photovoltaic cells connected together in this

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manner form a PV module. Weather-proof electrical connections are mounted on the back of the module for quick connections to other modules that comprise the PV array.

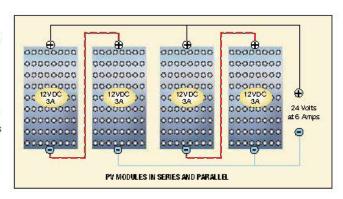
Modules come in a variety of sizes and rated outputs. A standard size module is approximately 5 feet by 3 feet, produces 20 to 40-volts, and consists of 50 to 72 solar cells. An average size crystalline module weighs between 30 and 50 pounds, most of which is the weight of the glass.

PV panels have no moving parts. An owner may need to occasionally wash dust, dirt, and bird droppings off the panels to keep them operating at peak efficiency. The panels themselves are completely weather proof, so there is little danger to those who perform this maintenance function.

2.4 PHOTOVOLTAIC ARRAY

One or more strings of modules forms an array. The modules are wired together in series to increase voltage, like the batteries in your flashlight. The strings are then wired together in parallel to increase amperage. Residential systems with outputs of 600 volts are common. The average household in California uses about 6,500 kilowatt-hours per year. A PV system in the three-to four-

kilowatt range should adequately meet most residential electrical needs. A 20 module array, capable of generating over 4,000 watts, will weigh approximately 900 to 1,050 pounds. The weight of the system will be equally distributed over approximately 420 square feet of the roof, resulting in an increase to the roof weight load of approximately 2.5 pounds per square foot.



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2.4 PHOTOVOLTAIC TILES AND SHINGLES

Some residential PV systems are designed to be installed integrally with the roof tiles or shingles. These PV tiles or shingles become part of the roof system. This type of PV system is a form of "building-integrated" design. PV roof tiles match the depth of cement or clay tile roofs, and PV shingles do the same with composition shingles.

For building owners living in certain fire hazard severity zones, roofing systems must meet the California Building Code (CBC) for Class A roofing materials. PV tiles or shingles would also have to comply with this regulation. Some manufacturers of PV roofing tiles have a Class A rating.

2.5 RACK MOUNTED PHOTOVOLTAIC MODULES

The most common installation of PV systems is to fasten the modules to racks that are mounted above the existing roof surface. This method of installation is useful to ensure that the modules are oriented properly toward the sun and properly anchored to the roof. In fire hazard severity zones, PV modules that are mounted on racks above the roof covering do not have to meet the CBC Class A roofing requirement as long as the underlying roof is Class A.

2.6 INVERTERS

An inverter is used to convert the power generated by the PV module from direct current (dc) to alternating current (ac) so that the electricity can be used by the consumer or directed in to the utility grid. Inverters come in a variety of sizes and styles:

Micro-Inverters: A single inverter that is next to or built into the individual PV modules. The micro-inverter converts the dc power at the module rather than at a single large inverter serving many modules.

System Inverters: System inverters receive current and voltage from many strings or arrays. This type of inverter can be located on the roof near the array or inside the building in a location such as a utility room.

Inverters contain capacitors which store energy. Once de-energized, the capacitors begin to discharge their stored energy. However, they may be capable of electric shock until their voltage has diminished.





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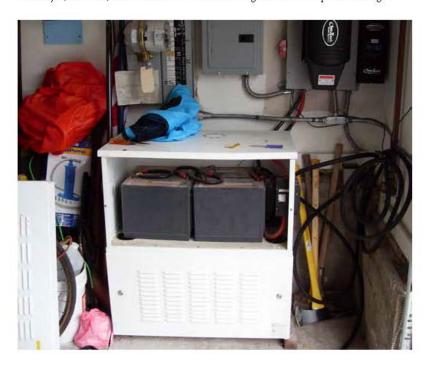
2.7 BATTERIES

Batteries are used to store solar-generated electricity. Batteries are used most frequently in off-grid PV systems, although batteries may also be used in grid-connected installations where the user wishes to have electricity available when local blackouts occur. Without batteries, a PV system cannot store electricity.

A battery is an electrochemical cell in which an electrical potential (voltage) is generated at the battery terminals by a difference in potential between the positive and negative electrodes. When an electrical load (appliance) is connected to the battery terminals an electrical circuit is completed.

A battery cells consists of five major components: electrodes, separators, terminals, electrolysis and a case or endosure. Battery banks consist of several batteries wired together with "jumper wires" to achieve the desired voltage and amperage.

There are two terminals per battery, one negative and one positive. The battery may contain a liquid electrolyte; however, it can also be immobilized in a glass mat or suspended in a gel.



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SECTION 3: OPERATIONS AND TACTICS FOR PHOTOVOLTAIC SYSTEMS

Terminal Objective

At the conclusion of this module students will be understand hazards and related factors necessary for operations involved in emergency response.

Enabling Objective

The student will be able to:

- Recognize PV systems
- Identify system locations
- Identify hazards with PV systems
- Perform size up
- Have knowledge of strategies and tactics

3.1 INTRODUCTION

Fire Department response, to buildings equipped with PV systems, has become more and more frequent. The increase in response to incidents involving PV is not because the systems are unsafe or hazardous in general, but because improved technology and lower cost and has made these systems a common addition to both new and existing buildings. Owners of residential, commercial and industrial occupancies see these systems as a source of "green" energy available at a greatly reduced rate when compared to the increasing cost of energy provided by public and private utility companies.

Many firefighters view PV systems as a hazard because they're located on or near buildings and they generate electricity. As with any new technology we as firefighters encounter, the more knowledge firefighters have the more successful they will be in developing a successful tactics and strategies when operating at incidents involving PV systems.

Operating at incidents where PV systems are present may require firefighters to adjust their actions somewhat; however these adjustments should be similar to those that are necessary with many other types of electrical equipment or power generating sources.

If firefighters are able to identify the presence of PV systems and understand the hazards associated with the technology, they can then adjust their operations to mitigate the situation in the safest and most effective manner.



Firefighters need to practice and train for roof operations and ventilation techniques when photovoltaic systems are present

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3.2 RECOGNIZING PHOTOVOLTAIC SYSTEMS

Recognizing the presence of PV systems in an emergency situation is one of the most important factors in providing safe and effective fire ground operations. In addition, recognition of these systems plays a major role in the strategy and tactics that will be employed to mitigate the emergency. Understanding PV system components and how the PV system functions will allow firefighter's to determine the best approach to the incident.

There are four general types of systems:



Ground Mounted



Roof Mounted



Building Integrated



Other (parking structures, trellises, etc.)

Recognition of PV systems on or near buildings can occur in a variety of ways. These include: Computer Aided Dispatch (CAD) files, run book information, fire company inspections, pre-plans and familiarity with areas of the response district in which "green" construction is prevalent. However, on-scene visual observation may be the first indication that the building is equipped with a PV system. A visual

observation may not always be counted on because often PV systems cannot be seen from the street side or from ground level. Additionally, built-in PV and even roof mounted systems may be difficult or impossible to see at night.

A good "hot lap" or 360 degree view of the building on arrival increases the chance of spotting roof or ground mounted components. In some instances, the first information indicating there is a PV system on the structure may come from the crew assigned to the roof division.

Common indicators at ground level include exterior mounted electrical conduit, signage, inverter boxes, or switching that is not a normal component of the utility service box. Recognition and familiarity of these components can be enhanced by company-level training and study of these systems.

Firefighters working on the roof should communicate what they see and how the system could potentially impact the strategy the Incident Commander has chosen. The Division supervisor needs to assure crew safety and maintain situational awareness during operations near the PV system.

3.3. HAZARDS

Like other power generating devices, PV systems have certain hazards associated with the technology. Many of the same hazards associated with PV technology are present at incidents where PV systems are not present. This is because they are general electrical hazards not specific to PV systems. Like other electrical systems, the components are only hazardous if the system is compromised or directly involved in fire or the protective coverings on the components are damaged. The following lists some of the hazards associated with PV technology. Recognition and understanding these hazards will increase firefighter safety.

3.3.1 Electrical Hazards - Firefighter Electrical Safety!

The primary danger to firefighters working around an electrical system, and specifically PV systems is electrical shock. What makes electricity hazardous to firefighters is that it cannot be seen and can strike unsuspecting victims, sometimes fatally. A review of NIOSH after-incident reports reveals that even people with knowledge of electricity, such as electricians and linemen are killed every year in electrical accidents. The NIOSH reports (available at http://www.cdc.gov/niosh/fire/) also reveal that a number of firefighters are also killed and injured annually in electrical incidents.

3.3.2 Electric Shock and Burn Hazards

PV systems typically have the capacity to generate electricity in the range of 600 volts. This voltage, even at low amperages, is extremely dangerous to fire-fighters who may come in contact with it.



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In general, electricity can cause a variety of effects, ranging from a slight tingling sensation, to involuntary muscle reaction, burns, and death. The physiological effects produced by electricity flowing through the body include:

AMP	Physiological Effect
6-30mA	Painful shock, muscle control is lost. This is called the freezing current or let go range.
50-150mA	Extreme pain, respiratory arrest, and severe muscular contractions, individual cannot let go. Death is possible.
1 to 4 amps	Ventricular fibrillation, muscular contraction, and nerve damage occur. Death is likely.
10 amps	Cardiac arrest, severe burns, and probable death.

Even at levels lower than 6mA, an involuntary muscle reaction could trigger a fall from a roof.

3.3.3 Resistance to Electricity

A "grounded" firefighter provides an excellent path for electrical current to go to ground. When this happens to a firefighter there are a number of variables that determine the degree of injury that may be sustained. These include:

- * Amount of current flowing through the body
- * Pathway of the current through the body (hand-to-hand or hand-to-foot)
- * Length of time the body is in the current
- * Body size and shape (muscle mass and body, the larger the person the more resistive)
- * Area of contact (with conductive parts)
- ★ Pressure of contact (of skin to the contacts)
- * Moisture of contacts (sweaty skin will be more conductive than dry skin)
- Clothing and Jewelry
- * Type of skin (callused hands opposed to back of hand)

Electrical shock is one hazard when working around electricity—burns are another. Burns that are caused by electricity include electrical, thermal and arc burns.

An arc-flash can occur when there is sufficient amperage and voltage and a path to ground or to a lower voltage. Arc-flashing is most common in ac circuits due to the presence of high amperage. Temperatures generated by arcing electricity can reach 15,000 to 35,000 degrees and can melt or vaporize metal in close vicinity. It can also burn flesh

Important Note: Firefighters should not disconnect power by removing the electric meter from the meter box. Experience has shown that electrical arcing can occur and cause injury or death to the firefighter. Instead firefighters should lock out the main disconnect next to the meter and lock out/tag-out the meter box to insure that someone does not inadvertently re-energize the system

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and ignite clothing at distances of up to 10 feet. The best way to prevent arc-flash hazards is to de-energize electrical equipment and circuits before approaching or touching electrical equipment.

3.3.4 Trip, Slip or Fall Hazards

PV systems are comprised of metal, glass, conduit and cable, all of which are slippery when wet. Some of these components protrude above the roof line or crisscross the space between rows of modules and may not be visible to firefighters in dark or smoky conditions creating a trip and fall hazard. Building integrated components, such as roof tile or shingle shaped PV modules may not be visible at all to a firefighter walking across a roof at night.

Important Note: While you already know to avoid trip hazards posed by vent stacks, skylights and other obstacles on the roof, you now need to also consider walking and working around the photovoltaic array and in as many cases solar water heating and swimming pool heating collectors.





3.3.5 Increased Dead Load Roof Loads

A PV system installed during new construction or retro-fitted onto an existing building adds weight to the roof assembly. Light-weight constructed roofs are engineered to carry the building's design load under normal conditions. They are not designed to continue to support a load under fire conditions. The additional weight of a PV system, whether part of the original design load, or added as a retrofit, is likely to cause a roof to fail sooner.



3.3.6 HazMat—Firefighter Inhalation Hazards

Many hazardous materials used in the semi-conductor industry are also used in the construction of PV modules. These include: silicon, boron, phosphorus, cadmium, tellurium, arsenic, and gallium. Under normal conditions, these materials are sandwiched and sealed between a layer of glass and a plastic backing all of which are encased in an aluminum frame. During a fire involving PV modules the aluminum frame can easily deform or melt, exposing these materials to direct flame. The hazardous materials then become dissipated in the smoke plume and may be inhaled by firefighters not wearing breathing apparatus. Firefighters should also take caution when performing overhaul on and around PV

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Recommended Practice

The inhalation hazards from the chemicals inherent in PV modules engulfed in a fire or explosion can be mitigated as long as firefighters wear their SCBA's and personal protective equipment during a structural firefighting and overhaul operations. It is the decision of the Incident Commander whether or not the emergency constitutes sheltering the population "In-place" downwind of the emergency. Fire or explosion emergencies involving large number of PV arrays, as in a commercial application, may necessitate evacuating downwind of the emergency.

modules and other electric components and continue to wear respiratory protection until the scene has been cleared by safety or hazardous material personal.

3.3.7 Battery Hazards

In some PV systems, batteries are used to store solar-generated electricity. Batteries are used most frequently in off-grid PV systems, although batteries are also used in grid-tied applications where the user wishes to have electricity available in the event of a power failure. Without batteries, a PV system cannot store electricity. Typically, several batteries will be arranged to form a "battery bank". The batteries in the bank are connected to each other with "jumper wire?" to either increase voltage, or to increase amperage. The most commonly used batteries are lead acid. Lead acid batteries contain sulfuric acid that can cause harmful and explosive fumes. Once it has been determined that a building has a bank or banks of batteries, the IC and all personnel operating around the batteries should be notified.

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During normal charging operations, batteries emit both hydrogen and hydrogen sulfide gas. Both of these gases are highly flammable. Hydrogen is lighter than air and hydrogen sulfide is slightly heavier. For this reason, spark producing equipment and open flames are not allowed where batteries are used or stored. Firefighters operating in and around battery storage areas should only use flashlights and other equipment approved for CLASS 1 atmospheres.

Another type of battery that is in use for PV systems is the Lithium ion battery. Lithium ion batteries are more efficient than lead acid batteries and therefore can take up less space. Lithium ion batteries contain flammable liquid electrolyte that may vent, ignite and produce sparks when subjected to high temperatures, damaged or abused (e.g., mechanical damage or electrical overcharging). Lithium ion batteries may burn rapidly with flare-burning effect and may ignite other batteries or combustibles in close proximity. Contact with the electrolyte in the lithium

ion battery may be irritating to skin, eyes and mucous membranes. Fire will produce irritating, corrosive and/or toxic gases including hydrogen fluoride gas. PV modules themselves have no storage capacity. Inverters have capacitors which do store energy; however, the energy within the capacitors is discharged soon after power to the inverters is disconnected.



Inverters have capacitors that store energy which is discharged soon after power to the inverters is disconnected.

Important Note

Never cut into batteries under any circumstances! Even though the voltage generating PV system may be disconnected from the battery bank, the batteries themselves still have potential for electrical shock. If the battery is punctured by a conductive object, assume that the object may be charged.



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3.4. SIZE-UP

Every firefighter is familiar with the term size-up. A good size-up is critical to starting the incident down the appropriate path to a successful conclusion. In the case of PV systems, it is extremely helpful to be aware of the presence of these systems prior to an incident. The reason for this is quite simple; the presence of these systems could possibly cause a change to strategy and tactics.

Pirefighters should be aware of PV systems in their response district. Information about systems can be collected from a variety of sources:

- * Company Pre-Incident Survey sand Prevention Inspections
- * Fire Prevention Bureau records
- * Building and Planning Department responsible for issuing the installation permit
- * Visual observation



Doing a 350 degree size-up becomes increasingly difficult in dense housing areas. Firefighters should look for all visual clues including the sighting of this inverter in the open garage.

Information on building sequipped with PV needs to be available to firefighters in the event of an incident. The information should be added to CAD files, included in the dispatch, included in the text on Mobile Data Computers (MDCs), and added as a symbol in run books. This pre-incident information will assist with on scene size-up and with determining the appropriate mode of operation, tactics and strategy.

Determining whether crews will be in offensive or defensive mode is based on many familiar factors, here are a few, in no particular order:

- * Time of day—day or night;
- * Life safety issues;
- * Type of construction: Type I, II, III, IV, V;
- * Method of construction—common, URM, balloon frame or engineered;
- * Building features/height;
- * Building density/spacing;
- * Age of the building;
- * Type of fire—structure fire, contents fire or PV system fire;

What to do in a PV Emergency

- * Always wear protective clothing and SCBA
- * Avoid Wearing Jewelry
- * Use hand tools with insulated handles
- * Locate Battery storage area (if applicable)
- * Be aware that biting and stinging insects could inhabit the module frame and electrical junction boxes
- * Lock out/tag out system disconnects should be located and disconnected.

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- ★ Volume/involvement of fire;
- * Resources available;
- ★ Lost time intervals between inception on-scene time.
- ★ PV system present;
- The system is involved in the fire or is an exposure;
- ★ The system or system modules are what's burning.
- ▼ Type of system—rack mount or building integrated;

The strategy will be determined after these and other initial size-up factors are assessed and an Incident Action Plan (IAP) is developed.

Just as information about potential fire behavior, building and roof construction is important to know during size-up, knowledge of the PV systems location and components will also be important factors in both pre-incident and "on-scene" size-up.



3.5 STRATEGY AND TACTICS

Strategy and tactics are the life blood of any incident. If these two pieces of the incident are not based on sound operational policy, training, and a well thought out approach to the problem, the entire incident will be compromised

In incidents in which PV Systems supply the building with power, the firefighters on scene need to be trained in identifying PV systems and the methods to control them. In addition, they must know how to adjust their assessment of the incident involving PV to ensure appropriate actions are applied to the incident.

In any incident, the desired outcome is to always mitigate and/or control the situation in a safe and efficient manner. The strategy and tactics firefighters choose are critical to both the outcome and the safety of all members working on the scene.



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The modules on fire at the Long Beach Convention Center were damaged in shipping and field repaired by the manufacturer's rep prior to installation.

3.5.1 Strategy

Generally, the strategic mode for a fire incident is either an offensive or a defensive attack. The Incident Commander might switch from one to the other but cannot accomplish both at the same time. Once the IC has completed the size-up and has chosen a strategy, the IC will assign the necessary tasks to the fire companies.

Fire fighters must quickly determine if the system itself is involved in the fire and if the system is able to be de-energized and notify the IC. The IC may need to adjust the strategy and potentially re-arrange the order of the tasks needed to deal with the PVs. If the IC chooses an offensive strategy it needs to be supported as any other fire with or without PV systems. However, the tactics used to support an offensive strategy may need to be flexible do to the presence of the PV system and the inability of firefighters to de-energize all of the electrical equipment.

The strategy selected by the IC should have "trigger points" that will allow the IC to assess the fires impact on the structure and change strategy if a delay in the attack caused by the PV system results in excessive lost time.

Another factor to be considered by the IC is the presence of the sun. A fire occurring during nighttime will allow for a different strategy than a fire during daylight. However, if the incident proceeds past sunrise, the IC must be aware that the sunlight will cause the panels to become energized and the initial strategy may need to be adjusted accordingly.

3.5.2 Tactics

Tactics are generally based upon the selected strategy and chosen objectives. As with the strategy, the implementation of tactics may be affected by the presence of a PV system. In buildings equipped with PV systems, control of the utilities must include control of the PV system as well as the local utility supplied power. In addition to de-energizing equipment powered by the local utility, the Utility Group must also de-energize electrical circuits leading from the PV system. The Utility group should locate and disconnect any and all switches in the PV system,





The Utility Group should watch for visual indicators like these warning labels to identify the existence of additional electrical power sources to the building.

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including switch-gear on the roof, switches on either side of an inverter and any switches in the connection to the building's main electrical system.

In PV systems, there is always the possibility of energized conductors within conduit during daylight; therefore, knowledge of the location of PV system conduit is important to firefighters performing tasks such as ventilation and overhaul. When possible, the Utility Group should also determine the location of all electrical conduits leading away from the array or otherwise

Aggressive fire operations are important whether or not a PV system is present.

connected to the PV system. Prior to overhaul, the Utility Group may consider marking the PV system conduit with bright spray paint or other means that will be understood by other firefighters working around the conduit.

If the system is "off-grid," the Utility Group should determine if the building is served by other electrical sources in addition to the PV system. These may include fuel powered, wind and hydroelectric generators. The Utility Group should attempt to isolate all of the sources, including the PV, by locating the system controls and opening the main disconnects.

A Ventilation Group or Roof Division should advise the IC if the PV array is going to impact the crew's ability to ventilate the structure effectively from above. If vertical ventilation cannot be accomplished, the IC needs to be notified immediately so that strategies and tactics can be adjusted. Changing to another form of ventilation requires coordination with the IC and interior crews.

3.6 COMMUNICATIONS

Communications have been proven time and time again to be an important factor in any incident; too much or too little communication may be detrimental to the overall incident. Within the Incident Command System, "Unity of Command" allows for each person to report to only one designated supervisor and "Span of Control" limits the number of people reporting to each supervisor. This communication model allows for direct, clear communication of information and events and contributes to the success of any incident.



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Good fire ground communications have some very basic and specific characteristics that should always be used during an incident. Fire ground communication should be dear, concise and informative. Some of the communications normally heard on the fire ground frequency are:

- Initial size-up
- Initial mode of operation
- * Tactical assignments
- Command changes
- * Primary and secondary search findings
- * Progress up dates
- * Time intervals
- Accountability—Personal Accountability Reports (PAR), Conditions Actions Needs (CAN), Personnel Position Progress Needs (PPPN), etc.
- Hazard notifications
- ★ Emergency Traffic and broadcasts
- * Changes in operational mode

Communications at incidents that involve PV systems should not be different than communications at any other incident. However, some of the communications will involve terms and phrases found throughout this training program that may be specific to the PV systems and how the system will impact the overall operation. Training officers, company officers and firefighters should include PV scenarios in training so that terms such as PV, BIPV, array, inverter, ac, dc and other terms used when describing components of a PV system are familiar to firefighters and can be used during fires when PV systems are present.



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3.7 FIRE GROUND OPERATIONS

Offensive fire ground operations involving any structure with a PV system will require personnel to take certain precautions. Common PV hazards include:

- Electric shock
- Hazardous atmosphere
- * Explosion/arc-flashing
- * Collapse
- * Trip, slip or fall

During day time incidents involving buildings with a PV system it is important to remember that the panels are always "Hot"

While these hazards aren't unusual to firefighters operating on the fire ground, they may be accentuated by a PV system. The existence of a PV system will not necessarily prevent the initiation of offensive tactics; the system may have no impact on the fire whatsoever. Tactics necessary to perform rescues, exposure protection, confinement, extinguishment, salvage, ventilation and overhaul can and should still be initiated within buildings that have PV systems. However, the possible additional hazards that may be created by a PV system should always be considered before undertaking any of these operations.

Recognizing the hazards, the use of protective gear, and avoidance of the PV system components will be fire fighters best defense when working around PV systems. However, the possible additional hazards that may be created by a PV system should always be considered

As discussed in previous sections, PV systems may not be obvious to firefighters approaching a building from the street level. In many modern subdivisions building integrated PV, such as PV shingles or building sidewalls may make the PV system difficult to detect. In densely populated urban areas with little or no access to the sides and rear of a structure, the ability of first arriving companies to complete a 360° size-up will be limited. Roof operations personnel or the Utility Group may be the first to locate a PV system. Early recognition of and communications about the PV system by firefighters operating on the fire ground is imperative. This information will aid the Incident Commander and other personnel in establishing a strategy, determining risk, and prioritizing their tactical objectives.

During day time incidents involving a PV system, it's important to remember that the panels are always producing energy. The Incident Commander should assign a Utilities Group to locate and

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Firefighters should never "pull" the electric meter as a way of shutting down the power to the building.

Residential PV Disconnect with Labeling. The interior of the disconnect box shows how lines are disconnected when the knife switch is activated.

de-energize all of the PV components, along with any other utility supplied electrical service serving the building in order to reduce the risk of electrical shock to firefighters. The power disconnects for the PV system components should be located and placed in the "Off" position, and "Lock out/Tag out" measures used. By code, these components should have specific signage or labels designating their location, however, this may not always be the case.

3.7.1 Roof Operations

There are few more effective ways to improve interior conditions for victims and firefighters inside a structure fire than ventilating the structure. Roof operations can aid in rescue opportunities in light wells and in the rear of a structure, and provide the Incident Commander (IC) with valuable fire condition reports. The Roof Division or Ventilation Group may often be the first to determine exactly what is on fire.

Are the PV panels or electrical components burning, or is it a structure fire? Early recognition of the problem and notification to the IC are key to the development of an Incident Action Plan (IAP).

A PV array built onto a roof may affect ladder placement and use; requiring fire crews employ other methods to gain roof access. On buildings with a sloped roof, the PV panels will normally be found on the South and West facing sides. Commercial and residential structures with flat roofs may have a large portion of the roof covered by the PV array. Ground ladder placement, instead of an aerial ladder, may be needed to achieve the best access/egress point for the operation. Even though there are hazards to fire fighters performing roof operations in close proximity to PV systems, they most likely will not prevent crews from completing their tactical objectives.

If vertical ventilation cannot be completed the Incident Commander must be notified immediately so that the incidents tactical objectives can be reevaluated and changed

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A roofing system, with two layers of composite shingles and a PV array may be compromised when affected by fire.

One of the primary goals of roof operations should be to determine if the PV system components themselves are on fire, or are the PV components being impinged by fire. There are toxic inhalation hazard associated with burning PV modules due to the chemicals used to manufacture the modules. Firefighters can be protected from these hazardous chemicals with the use of a Self Contained Breathing Apparatus (SCBA). Once roof operations are started, firefighters should quickly complete their objective and safely exit the roof. Any additional time spent on a roof with a PV system will only subject personnel to additional hazards.

If the PV system components experience a mechanical failure, or have been compromised by fire, arcing or faulting may occur. This electric shock hazard may prevent firefighters from being able to work safely on the roof and may cause operations to be abandoned and strategic and tactical objectives reevaluated.

Additionally, the building's roof structure should be evaluated determine the collapse potential due to the added weight placed on the roof by the PV system. Light weight truss or wooden I-beam construction could result in a collapse if the fire has sufficiently degraded the roof's structural components. In general, rooftop PV modules are not very heavy. The additional weight added to a structure by a PV system is generally 2.5 to 3.5 lbs/sq. ft. This is far less that the 10 lbs/sq. ft. engineered roofs are usually designed to carry. By comparison, a single layer of 30-year composition shingles is roughly 4 lbs/sq. ft, and covers 100% of the roof surface, while a PV system will usually only cover a portion of the roof.

The number of roof layers under a PV system is important to fire crews on the roof. By code, PV systems should not be installed onto roofs with more than 2 layers of composite roofing material due to weight limits. If the structural stability of the roof is in question, remove some roofing material and perform a quick inspection. Firefighters should consider a roof with a PV array mounted over 2 layers of composite shingles as highly compromised when the roof structure is impinged by fire. A roofload can also be negatively affected due to a PV array's ability to trap snow or other debris. Snow and debris will add to the dead load on the roof and increase the possibility of collapse. On windy days, rooftop arrays can act like sails producing large amounts of force pulling against the roof structure

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under the panels. The Incident Commander and roof personnel should evaluate the structural hazards the array's present and make the determination to abandon roof operations if necessary.

PV panels, mounting systems, and conduit present a trip, slip and fall hazard to firefighters. This is particularly true under two circumstances:

- BIPV shingles built into a sloped roofs shingle system can be extremely slippery and hazardous to firefighters walking on them.
- Because PV arrays on commercial structures often cover large portions of the roof, there may be very little clear space on which to walk.

Night operations, weather and smoky conditions will only compound these issues. Crews must move and work with additional caution because of these hazards. If possible, the tactical operations to be carried out on the roof should be done away from all PV components. Roof personnel may need to reevaluate their position and access the roof from an alternate location. Emergency egress points need to be determined early in the operation. Avoid positioning you and your crew so that the PV system is between you and your escape route. Situational awareness is key when operating near PV components.

Because PV panels continuously produce electricity during daylight, it may prove difficult to remove all burning or smoldering materials from under or around the panels without subjecting crews to an electric shock hazard. Removal of the panels, unless done by a qualified PV technician or electrician, is not recommended and strongly discouraged. Firefighters may find it necessary to contain the fire and prevent its spread until the panels can be safely removed. It is strongly recommended that fire departments maintain a list of several licensed solar power installers or electricians that are willing to assist their department in securing or de-energizing PV systems and components in the event of an emergency.

3.7.2 Ventilation Operations

PV panels located on the roof may present a significant obstacle for fire fighters assigned to ventilate. Vertical ventilation can be delayed or prevented because of the size and location of a building's PV system. Cutting a ventilation hole directly over the fire will not be possible if the area is covered by a PV array or it's structural support frame. Ventilation operations must be limited to those areas of the roof that are clear of the PV array and other components. If ventilation operations have to be done in close proximity to a PV system firefighters must be sure they do not cut or otherwise damage any of the system components. If possible, a safety officer

Not only are PV modules slippery when wet, they are not designed carry weight and therefore should not be walked on by firefighters.

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should be established to oversee operations when firefighters are work in dose proximity to the PV array.

PV system conduit containing energized conductors on the roof deck and in attic spaces poses a serious shock hazard to firefighters performing ventilation. Crews must work together to prevent damage to any PV components with their tools or actions. If vertical ventilation cannot be completed, the IC must be notified immediately so that the incident strategy and tactics can be reevaluated and changed, if necessary. Horizontal or positive pressure ventilation may have to be used to perform ventilation if the roof is obstructed by the FV array or other system components.

3.7.3 Interior Operations

Interior fire ground operations may also be affected by a buildings PV system. Energized system components located inside the building may create an electric shock hazard for interior crews. PV system conduit and wiring can be located in any portion of the building, including equipment rooms, closets, garages and attic spaces. Personnel must avoid coming in contact with these hazards and notify the Incident Commander and other firefighters of their location. When engaging in firefighting tactics on structures that may have energized PV systems, the issue of whether or not to apply water is an important tactical decision. If possible, firefighters should avoid directing hose streams directly onto energized PV system components and use or dry chemical extinguishers, if possible. If water is used, the following recommendations from Pacific Gas & Electric's (PG&E) Emergency Responders Training Program² should be followed:

- ★ There should be a minimum of 100 psi at the nozzle.
- ★ The fog spray should be set at 30 degree fog pattern at 100 psi.
- Firefighters must be at least 33 feet away from the energized source.
- Straight streams or foam should not be used. They are excellent conductors and put the responder at great risk.

CAUTION Solar PV Wiring May Remain Earrgued
Affect Disconnection During Daylight Hours.



Traditional "Hot Sticks" used by the fire service are not recommended because they are designed to test for ac power only.

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² Source: "Responding To Utility Emergencies"; Pg. 63, 2004; Michael Callan, Public Safety Program Mgr, PG&E

The Utility Group, when assigned, should be tasked with locating and disconnecting all power sources supplying the building



Further, the PG&E recommendations point out that the electrical resistance of the ground can change due to water runoff, thereby creating an additional hazard to firefighters.

Fire ground water usage on or near PV system components should be based on conditions found at the time of the incident and department SOPs. If water has to be directed on or near a PV system a 30 degree fog pattern at 100 psi should be used in order to prevent any electric current from traveling up stream toward firefighters applying the water. Firefighters also need to be cautious of the electric shock hazard created by puddles of water.

The Utility Group, when assigned, should be tasked with locating and disconnecting all power sources supplying the building. These could include PV systems, electrical utility service, fuel, wind and hydroelectric generator sources. These disconnects may be numerous and in multiple locations. PV system and other electrical source disconnect switches must be located and "locked out".

It is important to remember that the PV modules and arrays will still produce electricity to the inverter during daylight hours and that an electric shock hazard exists. Traditional energy sensing "Hot Stick?" used by the fire service are not recommended because they are designed to test for accurrent and voltages only. Some department members may have enough experience with electricity to use an ac/dc multi-meter to confirm that power isolation has been achieved, otherwise, it is strongly recommended that firefighters wait for the arrival of a qualified solar technician or electrician.

If present, battery banks can also present toxic and explosion hazards for interior firefighting crews. The fumes and gases generated by batteries exposed to fire are corrosive and flammable. Spilled battery electrolyte can produce toxic and explosive gases if it comes in contact with other metals. Because of these hazards, water as an extinguishing agent should be avoided if possible, or dry chemical extinguishers are strongly recommended for extinguishing fires involving lead-acid batteries.

Pirefighters should never cut battery cables as a means of disabling a bank of batteries. Even after the batteries have been isolated from the electrical generating system, the batteries still have electric shock potential. Crews must wear full personal

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Incidents involving PV systems are unique, in that energized components may remain within the structure or on the roof even after all common power has been disabled

protective equipment (PPE) and SCBA when dealing with an emergency involving PV system battery banks. Due to the high degree of hazards associated with these batteries, the IC may have to stop interior operations and reevaluate the strategy until the hazardous atmosphere can be tested and mitigated through ventilation. Hazmat teams with specific protective dothing may need to be called to the scene to aid in operations.

3.7.4 Search Operations

Search and rescue is the first tactical priority firefighters when approaching any fire scene. Searching under extreme heat and smoke conditions, often in zero visibility and with no hose line for protection, makes this one of the most dangerous tasks done on the fire ground. Search teams conducting primary and secondary searches for victims may unknowingly come in contact with energized PV components that may have been damaged by the fire and lay exposed. The location of the components must be immediately relayed to the IC and all personnel working on scene, and disconnect switches turned "OPF".

3.7.5 Overhaul

Overhaul is an important task performed during the later stages of every fire in order to ensure complete extinguishment and prevent rekindle. Firefighters engaged in overhaul operations need to be aware that a building's PV system conduit can be hidden behind walls and in attic spaces. In buildings equipped with PV, the use of tools to breach walls and ceilings to search for fire extension must be performed with extra caution. This is particularly true during daylight hours when some PV components are energized. Whenever possible, the IC should delay overhaul until there is competent confirmation that the PV system has been "de-energized."

Once the fire has been extinguished personnel safety is still a critical concern and often can be taken for granted as the incident enters the stabilization phase of the IAP. Many fire ground injuries and even fatalities have occurred well after the fire is out. In recent years, a fire investigator was killed by the collapse of a freestanding chimney several days after fire companies left the scene.³

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³ "Firefighter Fatalities in the United States in 1999," National Fire Data Center, U.S. Fire Administration, July 2000.



NFPA 1561

- 5.3.24 The incident commander shall be responsible for the continuation, transfer, and termination of command at an incident.
- 5.3.25 The incident commander shall order the demobilization of resources when appropriate.
- 5.3.26* The incident commander shall provide for control of access to the incident scene.
- 5.3.27 The incident commander shall make appropriate incident status notifications to key people, officials, and the agency administrator.

At the conclusion of an incident, demobilization and termination efforts should be directed at leaving the property in the safest condition possible.

An overhaul focused size-up and risk-benefit analysis should be conducted. Incidents involving PV systems are unique in that components may remain energized within the structure or on the roof even after all utility supplied power has been de-energized. Along with a structural stability assessment, hazard identification and the marking of any potentially energized areas should be a priority. Investigators, building officials, property owners, and/or building maintenance engineers should be properly notified of any hazards that may exist. A qualified PV technician or electrician should be called to the incident to de-energize any system that has been compromised or creates a hazard.

Transferring scene safety and security to an appropriate local, municipal authority may be an option if the fire department is unable to quickly secure the assistance of a qualified PV technician or electrician. All hazards should be appropriately marked or barricaded. Structures should not be released by any agency until all obvious hazards have been eliminated.

SECTION 4: RESIDENTIAL/SUBURBAN

Terminal Objective

At the conclusion of this module students will be able to recognize common attributes & hazards of a typical residential PV system.

Enabling Objective

The student will be able to:

- Identify residential PV system components
- Identify unique hazards associated with residential PV Systems
- Identify Strategic & Tactical Considerations

4.1 INTRODUCTION

This section will address the installation of PV systems on residential structures. For firefighters, these will be the most common locations in which PV systems are found. Residential applications discussed in this section include one and two family dwellings and townhouses. Although these systems will most commonly be rooftop installations, they may be ground mounted or mounted on a stand-alone structure, such as a trellis or arbor.

Identifying the presence of a PV system at a residence is a primary objective for responding firefighters. The following is list of visual indicators that may help firefighters determine the presence of a PV system:

- ★ Visualization of the array upon on arrival.
- Visualization of the inverter. The inverter may be mounted on an exterior wall (often close to the main electrical panel), garages, or even in a basement.
- Labeling on the main electrical panel indicating the presence of the PV system.
- Exposed or concealed conduit runs on the roof, inside walls or in the attic. Exposed or concealed metallic conduit on the inside or outside of a residence is a strong indicator of the presence of a PV system.

The size of most residential systems will range 3kw to 8kw, with operating voltages up to 600 volts dc at less than 30 amps. While PV systems are capable of generating their maximum voltage in low light conditions, such as at dawn or dusk, the amperage, or current, varies



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throughout the day. Amperage output increases as the sun rises in the sky and decreases as the sun sets. This means that at about noon on a sunny day, the PV system is generating its maximum power.

In extraordinary circumstances, where all other tactics or options have been exhausted and the PV panels must be removed. Care should be taken to use non-conductive tools, since the modules and frames may still be energized. Damaged systems should not be touched without verifying whether or not the system is energized. Specialized tools may be required to disconnect wiring. Firefighters should consider containing fires within PV systems rather than removal due to the inherent hazard and lack of electrical safety training afforded to firefighters.

While the majority of residential PV systems that firefighters encounter may be grid-tied, the presence of a backup electrical generating system must be considered. This could be either a battery bank in the garage, or out-building or a generator. Determining the presence of batteries or a backup generator is often accomplished when the lights or appliances remain on after the main service disconnect is shut off The additional disconnects for other electrical sources may be numerous and



Installation of roof integrated PV system.

in multiple locations. PV system and other electrical source disconnect switches must be located and "locked out" in order to assure firefighter safety. (Refer to Section 6 for further discussion of battery systems.)

STRATEGY AND TACTICS

Following a good size-up of the incident and the determining that it is not the PV array or other PV components that are on fire, the choice of a strategic mode should be made by the IC following normal department SOP's. Tactics, like the strategy, should also be based upon normal standard operating procedures. What the presence of a PV system may change for firefighters at residential fires is their ability to ventilate the building and the complexity of utility control.

The presence of an array on a roof may affect laddering locations, access and egress. PV modules should not be stepped on due to their potentially slippery surface if wet. While they are designed to sustain a strong impact, they are not designed to support the weight of a person walking on them. Roof ladders should never be placed across an array. Building integrated PV (BIPV) on a tile roof

may be hard to see at night, are very slick, and could easily result in a fall. Ladder placement may need repositioning once a PV or BIPV system is discovered.

Vertical ventilation is one of the tactics that may be employed. The coordination of the venting operations on a building equipped with a PV system is a key component to the fire fight because the ventable area of the roof may be limited. Generally, firefighters ladder in the uninvolved area of the structure. However, this may not be possible due to the location of the PV array. Once the ladders are placed, an aggressive, coordinated opening should be made as close to the fire as possible. Coordination with the interior crews is important so that the opening is not made behind the crews, and so they are in a safe position if the ceiling is pushed down from above. Ideally, coordination with the Utilities Group is also needed because the Utilities Group may have some indication of where the PV system conduit is located.

Power saw and axe usage by the ventilation crew is of concern if the wiring run cannot be determined. Firefighters should give consideration to the depth of their cuts because the PV system conduit/wiring may be attached to the underside of the roof framing members. A good understanding of roof construction and cutting techniques is vital to the safety of the firefighters when the building is equipped with a PV system.

In cases where the conduit run is in the attic or walls, care should be taken when pulling wall or ceiling material to avoid contact with the PV conduit. Should the conduit become separated at its joints, it may no longer be grounded and contact by a firefighter may result in an electrical shock.

When the fire involves only the PV system and not the building, the priorities change to protecting the structure from involvement. Firefighter's initial efforts should be directed toward preventing the fire from



Fire departments should test their salvage covers on a PV array in advance of an incident to determine if they will successfully block light transmission.

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spreading to the roof or other nearby building components. If a portion of the array or other an electrical component is involved, or dry chemical extinguishers, or a 30° fog spray stream at 100 psi are the methods used to extinguish or confine the fire. Firefighters may have to continue their efforts to confine the fire to the system components for an extended period of time until a qualified PV technician arrives and assists in deenergizing the electrical equipment. Depending on the degree of damage and involvement of the system, there may be no protective grounding present, so contact with the array should be avoided.

The exclusion of light to de-energize the PV system is a tool that may be considered by the IC for residential PV systems. Testing conducted with both salvage covers and black plastic sheeting has proven to completely reduce the amount of energy produced by the PV system once it's fully covered. Salvage covers used for this purpose should be dark in color. White or other light colored salvage covers should not be used as they permit enough light transmission to allow the system to continue to produce energy. Salvage covers or black plastic sheeting must be positively secured in place over the array. Uncovering of the array by the wind or otherwise will cause the system to produce energy. Fire departments should test their salvage covers on a PV array in advance of an incident to determine if they will successfully block light transmission.

At the conclusion of an incident, demobilization and termination efforts should be directed at leaving the property in the safest condition possible. An overhaul focused size-up and risk-benefit analysis should be conducted. Incidents involving PV systems are unique in that components may remain energized within the structure or on the roof even after all utility supplied power has been de-energized. Along with a structural stability assessment, hazard identification and the marking of any potentially energized areas should be a priority. Investigators, building officials, property owners, and/or building maintenance engineers should be properly notified of any hazards that may exist. A qualified PV technician or electrician should be called to the incident to de-energize any system that has been compromised or creates a hazard. Transferring scene safety and security to an appropriate local, municipal authority may be an option if the fire department is unable to quickly secure the assistance of a qualified PV technician or electrician. All hazards should be appropriately marked or barricaded. Structures should not be released by any agency until all obvious hazards have been eliminated.

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SECTION 5: COMMERCIAL LARGE AND SMALL

Terminal Objective

At the conclusion of this module students will be able to recognize common attributes and hazards of typical commercial photovoltaic systems.

Enabling Objective

The student will be able to:

- Identify commercial system components
- Identify unique hazards associated with commercial PV systems
- Identify strategy and tactical considerations

5.1 INTRODUCTION

Although the number of residential sites greatly exceeds the number of commercial installations, there is a similar amount of PV (in total Megawatts) installed in small and very large commercial installations. This is because commercial systems tend to be larger than residential systems. Commercial installations include a broader variety of applications, given the greater variety of commercial structures and applications for solar. The most common systems are rooftop installations, but other installations may be located as a ground mount or mounted on a stand-alone structure, such as a parking shade cover.

Identifying the presence of a PV system is a primary objective for firefighters. Early recognition of the presence of a PV system will aid in the development of strategic and tactical goals. Unlike residential systems, where the arrays are often visible from the ground, a large percentage of commercial systems are installed on flat roofs and will not be visible from the ground. There may be large installations in communities that the local fire department is not aware of.

Communication between the fire department and the permitting agency can help identify these systems in the community.

During size up, identifying a commercial system can be accomplished through the following components:

- Labeling on the main service panel upon arrival and PV system disconnecting means.
- Surface mounted conduit coming down from the roof along the side of the building.



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- Visualization of the inverter. The inverter may be mounted on or near an exterior wall (often close to the electrical service entrance) or in electrical rooms.
- * Visualization of the array on arrival either from the exterior or after sending a company to the roof

The energy output for commercial systems will generally be between 10 kilowatts (kW) to 2 megawatts (MW). Although the power output of individual PV systems varies, in general the size of the area that these large systems cover is as follows:

10 kW 1,000 square feet

1 MW 10 acres

5.2 STRATEGY AND TACTICS

The presence of a large array on the roof may affect roof operations, including ladder placement, access/egress, and vertical ventilation. Depending on whether consideration has been given during design of access pathway to skylights and other venting opportunities, the presence of the array is likely to increase the amount of time needed to perform vent operations. Fire fighters should not step on modules and should be aware of the trip, slip and fall potential around PV racking systems, conduit and the



modules themselves. Many systems include narrow walkways between rows for maintenance access. While these rows are not intended for firefighter access, they may provide an alternative means of egress.

An important consideration while conducting operations on a roof with a PV system is the added weight to the roof. Although it is difficult to quantify how much the weight of the PV system will affect the potential for roof collapse, it must be factored into the initial size up, strategy, and tactics. The type of roof construction, roof material and area covered by the array should be considered when crews first access the roof. As previously stated, it is common to have acres of roof area covered by modules on large commercial structures.

PV systems mounted on low-sloped roofs employ a variety of mounting techniques. While some systems are mounted on racks that are welded or bolted to the roof structure, the majority of roof-mounted systems are mounted on what are called "ballasted" mounting systems. These ballasted systems use a combination of the weight of the PV modules and concrete ballast to keep the array in place on the roof. The weight of these ballasted systems is typically limited to 5 lbs/ft₂. In addition, the aerodynamics of the array is evaluated and wind spoilers are often employed to prevent uplift on the PV array. In locations

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where wind loads exceed the ability of the ballast and wind spoilers to hold the array, anchors are welded or bolted to the structure to provide an additional means to hold the PV array on the roof structure.

If the PV system is the source of the fire, then protection of the exposed structure is the primary concern. During daylight hours crews should consider all PV system modules and arrays energized and fight the fire as they would any other electrical fire. Crews should use or dry chemical extinguishers on any potentially energized PV component. If the roof material is on fire, a 30° fog stream at 100 psi can be used to prevent further spread of the fire without risk of shock to the firefighters. Firefighters, however, must be cautious of water pooling on the roof that could become energized. Care must be taken to avoid unnecessary contact with potentially energized PV components until they can be isolated and confirmed de-energized.

Depending on the level of damage to the system, the connection to "ground" may have been lost, contact with the PV system components should be avoided until the system is determined to be de-energized. Modules cannot be isolated during daylight hours and must always be considered energized. Firefighters working on and around PV systems should only use non-conductive tools, since the modules and frames may still be energized. Burning PV modules produce toxic vapors. Firefighters must wear full PPE and SCBA due to the toxic inhalation hazard produced by these burning components. Crews should work upwind of the smoke whenever possible.

In extraordinary circumstances, where all other tactics or options have been exhausted and the PV panels must be removed. Care should be taken to use non-conductive tools, since the modules and frames may still be energized. Damaged systems should not be touched without verifying whether or not the system is energized. Specialized tools may be required to disconnect wiring. Firefighters should consider containing fires within PV systems rather than removal due to the inherent hazard and lack of electrical safety training afforded to firefighters.

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Damaged systems should never be touched without verifying whether or not the system is energized. Firefighters should never cut the wiring in a PV system. Specialized tools may be required for disconnecting the module wiring. Firefighters should consider controlling fires within PV systems rather than removal due to the inherent electrical hazard. Mounting systems, modules, and conduit should not be disassembled, damaged or removed by firefighters operating on the roof until all of the PV system's components are isolated or de-energized by a qualified PV technician or electrician. Firefighters should limit their activities to containment of the fire until it can be confirmed that the system is isolated or de-energized.

At any incident where PV is present the IC must designate a "Utilities Group" early to aid in locating and disabling all of the buildings utilities and PV system components. This can greatly decrease the electric shock hazard to all crews operating on the fire ground. Firefighters must remember that all PV components must be considered "HOT" during day light. Additionally, in large commercial systems, there is likely to be several arrays. Firefighters must be aware that if a single array is isolated, all of the

others will most likely remain energized. Care must be exercised when operating the other energized arrays.

At the conclusion of an incident, demobilization and termination efforts should be directed at leaving the property in the safest condition possible. An overhaul focused size-up and risk-benefit analysis should be conducted. Incidents involving PV systems are unique in that components may remain energized within the structure or on the roof even after all utility supplied power has been de-energized. Along with a structural stability assessment, hazard identification and the marking of any potentially energized areas should be a priority. Investigators, building officials, property owners, and/or building maintenance engineers should be properly notified of any hazards that may exist. A qualified PV technician or electrician should be called to the incident to de-energize any system that has been compromised or creates a hazard. Transferring scene safety and security to an appropriate local, municipal authority may be an option if the fire department is unable to quickly secure the assistance of a qualified PV technician or electrician. All hazards should be appropriately marked or barricaded. Structures should not be released by any agency until all obvious hazards have been eliminated.



SECTION 6: GROUND MOUNT AND RURAL SYSTEMS

Terminal Objective

At the conclusion of this module students will understand what are ground mounted photovoltaic systems, hazards, size-up, strategy and tactics and the limited resources available in rural areas.

Enabling Objective

The student will be able to:

- Identify and learn what is ground mounted and where they may be located
- Identify hazards for ground mounted and rural PV systems
- Size-up, strategy and tactics may be different for ground mounted and rural areas compared to roof mounted PV systems

6.1 INTRODUCTION

Ground mounted PV systems generally stand alone and are supported by a framework that sits directly on the ground. These systems can vary in size from small 3 kilowatt (kW) system for a residence, up to several megawatts covering acres of land. Although the power output of individual PV systems varies, in general the size of the area that these ground mounted systems cover is as follows:

3 kW 300 square feet

100 kW..... half acre

1 MW 10 acres

Ground mounted systems are used as trellises, car ports, shade structures, pedestrian walkways and other free standing structures with no purpose other than to support the PV arrays. Ground mounted PV systems

are a viable alternative for facilities with sufficient land on which to place the arrays. Many farms, schools, waste water treatment plants, residences with large yards or open acreage, and many other types of facilities opt for a ground mounted installation rather than a roof mounted installation. You need to be aware that a ground mounted system may be supplying a facility that is located a significant distance from the PV installation, to the extent that it may even be difficult to determine the location of the supplied facility.

Photo is representative of these ground mounted systems, and depicts the nature of the array being remote from the facility.



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A ground mounted array consists of the same categories of equipment as a typical roof mounted system, with the addition of a structure with the primary purpose of supporting the solar array. Ground mounted systems typically supply power to a nearby facility, and connect to the electrical system of that building. PV systems may be very low to the ground, or may be mounted atop a taller structure specifically designed to support the PV array. The inverters and dc combiner boxes could be located at the ends of a row of arrays or in between rows of arrays. The dc conduit/ wiring to the combiner boxes may be running in between the rows of arrays.

6.3. HAZARDS

Ground mounted PV arrays pose a few specific hazards in addition to those posed by roof mounted systems. Some of the additional hazards firefighters need to be aware of when combating fires in the vicinity of ground mounted arrays include:

- Overgrown vegetative fuel may be under or around the array, or located in the vicinity of the array.
- Ground mounted structures may be used as shade structures for storage of equipment and/or supplies.
- Vehicles may be parked under PV car ports.
- * Tables, trash cans, and other combustible storage could be located beneath shade structures.
- On wild land fires, firefighters working around arrays that are involved in the fire should wear PPE and SCBA.



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6.4. SIZE-UP

Given the different characteristics of a ground mounted array, a thorough size up needs to be performed so the firefighters at the incident understand the specific challenges posed by the ground mounted installation such as:

- Many ground mounted arrays may have access restricted by security fencing.
- Access roads may not be suited for all weather conditions, not maintained, or may be nonexistent.
- ★ The PV system may be in a fire hazard severity zone.
- In rural areas, there may not be any fire hydrants or any additional water supply.
- * There could be a delay in locating the inverter or identifying other controls.

Ground mounted systems will vary widely in the design and details of the system; specifically equipment installations will vary from site to site. Disconnecting means are typically (but not always) provided to turn off the conductors connecting the array to the facility using the power. The disconnecting means is often mounted on the array structure or on a nearby backboard. At the building being served, there may also be a means to disconnect the power from the array.

The following is a partial list of typical system configurations you may encounter:

- The inverter and the ac and dc disconnect are at the array.
- The inverter and the dc disconnect are at the array. The ac disconnect is at the main service panel on the building being served.
- The dc disconnect is at the array. The inverter is at the building being served. The ac disconnect is at the main service panel on the building being served.
- The inverter is at the building being served. The dc disconnect is just upstream of the inverter and the ac disconnect is just downstream at the building being served.
- The inverter is at the building being served. The ac disconnect is at the main service panel on the building being served. The dc disconnect is just upstream of the inverter and at the array.





Large commercial arrays will have disconnects and inverters situated behind and protection by the PV array.

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6.5. STRATEGY AND TACTICS

Following a good size-up of the incident, the choice of a strategic mode should be made by the IC following normal department SOP's. Tactics, like the strategy, should also be based upon normal standard operating procedures

6.5.1 Strategy

In addition to department policies, the following items must also be considered when developing a strategy:

- * Fire conditions found on arrival.
- Is it the array that's burning or is a fire exposing the array?
- * Threatened exposures including wild land areas
- ★ Water and additional resources available

Once the IC has completed a size-up and developed an Incident Action Plan, the IC should determine the strategy and assign tasks to the fire companies. Due to the hazards associated with PV systems, the IC may need to adjust the strategy and potentially re-arrange the order of the tactics in order to deal specifically with the technology. If the IC chooses an offensive strategy it needs to be supported as any other fire operation with an emphasis on disabling all power sources to and from the PV system.





6.5.2 Tactics

Tactics will be based on the chosen strategy and department SOP's. If it is known that a PV System is present, utility control must become a primary objective. Isolation of the inverters and disconnecting the system from the main electrical panel will be an important task. The Utility Group should attempt to isolate all of the PV system by locating the system controls and opening all of the disconnect switches. The Utility Group must also look for and disable any other power source that can be connected to the system such as fuel, wind and hydroelectric powered generators.

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Another priority will be preventing further extension of the fire and isolating it to its area of origin. If the PV system itself is on fire it must be assumed to be "Hot" during daylight. Fire suppression crews should avoid physical contact with PV system components until it can be confirmed by a qualified PV technician or electrician that all power sources have been isolated. It may take time for the technician to respond and locate all of the system controls.

or dry chemical extinguishers should be used to contain or extinguish electrical fires. Water should be used to extinguish any ordinary combustibles under or near the ground mounted PV system, or if the volume of fire requires it use. If water is used, a 30° fog pattern from at least a 30 foot distance, at 100 psi is recommended. Full PPE must be used due to the potential toxic inhalation hazard if panels are burning. Fire crews should position themselves upwind and out of any toxic atmosphere.

During the overhaul and mop-up phases of the firefight, firefighters should avoid all potential electrical hazards until there is confirmation that the system no longer poses an electric shock hazard. Firefighters must avoid inadvertently damaging PV components with their tools. The IC may need the assistance from local PV technician to assist with disabling the PV system and confirmation that all of the hazards have been mitigated before incident is terminated and the scene is turned over to the owner or responsible party.

This ground mount array is equipped with a battery back-up system and battery meter or battery charge controller.

SECTION 7: OFF-GRID SYSTEMS

Terminal Objective

At the conclusion of this module students will be able to recognize types of photovoltaic systems, components, hazards and related factors when systems are involved in emergency response and recognize and understand mitigation.

Enabling Objective

The student will be able to:

- Identify system components
- Identify hazards with PV systems
- Identify system locations

7.1 INTRODUCTION

Off- grid, or stand-alone systems are defined as photovoltaic systems which are not connected to the local electrical utility's supply grid. Off-grid systems generally produce electricity for use in close proximity to the PV array. While most off-grid systems use banks of batteries for the storage of electricity, some systems may not.

Off-grid systems are most often found in rural areas which are not well served by the electrical utility companies. Instead of the current produced being converted to alternating current, these systems may be used to directly power direct current (dc) lighting or motors. However, in most cases, the electricity produced during daylight hours will be "banked" in on-site batteries for later use. Once banked, the electricity may be used as dc or converted to alternating current (ac) by means of an inverter. Like grid-tied systems, off-grid systems may be located on a structure. However, in the rural setting, the systems may be ground, roof or pole mounted, or any combination thereof.

In addition to the hazards identified in grid-tied systems, off-grid systems have their own set of hazards that firefighters should be aware of. These include:

- * Systems may have been installed without permits or inspection.
- Some components, such as charge controllers, may be "homemade".
- ★ Systems may lack discernable controls.
- * Systems may lack signage.
- * System components may be ungrounded.
- Battery storage banks may be located within rooms not suited for that purpose.
- ★ Battery storage banks may be located in adjacent or "out" buildings.



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- Hydrogen gas, produced while charging the batteries, is flammable and can ignite or explode if allowed to collect in unvented spaces.
- Battery storage systems may have numerous exposed terminals and conductors.
- Batteries typically contain acid which may spill if the batteries are involved in a fire.
- Batteries may also receive charging current from other sources such as fuel powered generators and wind or water mills.

Indicators that a PV equipped structure is off-grid and may have battery storage sets include the lack of a "service drop" from adjacent power lines or the lack of a service panel and meter. The presence of a fuel, wind or hydro powered generator may also be an indication that the structure is off-grid. Firefighters arriving at an incident involving a PV system or fire involving a structure equipped with a PV system in rural areas should look for battery storage systems and alternative generating sources during their size-up.



As with any utility supplied electrical source, an effort should be made to disconnect, or shut off the electrical current. Disconnect switches for PV systems equipped with batteries can usually be located near the battery bank and on the conductor(s) leading away from the batteries.

If the current coming from the batteries is being converted to AC, the disconnect switches and inverter may be configured in a manner similar to grid-tied systems; a disconnect switch located on the battery side, immediately upstream of the inverter.



Batteries used in storage systems are typically deep cycle batteries and rated 6, 12 or 24 volts DC. While individually these batteries have high amperage ratings, they lack sufficient voltage to cause life threatening injuries. However, if the batteries are connected in "series", the voltage can easily be increased to dangerous levels. Firefighters should avoid cutting or disconnecting the jumper wires that connect batteries to each other or to the system because of the arcing that may occur. Firefighters should also be cautious when using metallic tools around batteries as contact with battery terminals could result in fusing of the tool to the terminal.

Whenever practical, dry chemical or CO_2 extinguishers should be used on fires involving electrical equipment. This recommendation holds true for fires involving PV battery systems as well. As previously stated, typical batteries used for PV storage systems are lead-acid. When batteries are involved in fire, the plastic case containing the acid will melt, spilling the strong acid solution and creating a hazardous materials problem.

SECTION 8: FUTURE SOLAR TECHNOLOGIES

Terminal Objective

At the conclusion of this module students will be able to recognize types of photovoltaic systems, components, hazards and related factors when systems are involved in emergency response and recognize and understand mitigation.

Enabling Objective

The student will be able to:

- · Identify system components
- Identify hazards with PV systems
- Identify system locations

8.1 INTRODUCTION

New products that convert solar energy to electricity are constantly under development. Some may be placed in service and some may go by the wayside. In the future, it is likely that firefighters may need to be familiar with a wide variety of solar technologies in addition to the photovoltaic systems that have been discussed in this training course. As with many evolving technologies, there will be some developments that will reach the market and some that won't. The following is a list of technologies currently being developed:

Curtain Walls/BIPV. New high rise buildings may incorporate PV modules into the curtain walls on the south and west sides of the building. These systems are already in use in some locations in the US, Asia, and Europe. Of concern to emergency responders is vertical fire spread across what would otherwise be a non-combustible surface. Additionally, some of the modules (thin film) incorporate 2 layers of non-tempered glass, which could result in an increased falling glass hazards on the fire ground.

Smart Modules (Module level control). Several products are either in development or commercially available. This technology could put a higher level of communications and control at each module. They are marketed for increased performance in shaded conditions and energy production. The benefit to firefighters is that technology allows them to shut down power at the "module level" in the event of an electrical short or fire. This technology could be used by emergency responders to provide module level shut off in the event of a fire.





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Roof covering systems that are made entirely of PV. Similar to the BIPV modules, these PV modules would form the covering of the entire roof. There would be no roof covering or decking below the roof covering, just the membrane/insulation system. Currently these systems are

in use in Asia and Europe. They are not yet available in the United States.



Float-o-voltaics (floating PV systems). Built on pontoons, these PV modules are mounted on a floating platform. They are likely to be found where there is a high land value, such as farm lands and there is a body of water nearby. At least two systems are currently in operation in California.

Power plastics. Flexible solar panels that can be rolled up and carried anywhere. It can generate electricity from indoor light or outdoor

light. Can be configured as a window awning, outdoor canopy, or in consumer products (tents, umbrellas, handbags, clothing, etc.). Currently used by the military and on the market in a variety of forms.

Roof-top concentrating solar PV (CPV). This technology uses reflective metal troughs beneath a narrow row of PV cells in a "C" shape. The troughs focus the energy from the sun onto the PV cells to generate electricity. The troughs move throughout the day and focus the sun's energy to optimize power generation. A demonstration project is in place in California on a public building.



Solaren contracted with PG&E to bring solar energy from space.

Electricity from Space. In April 2009 Pacific Gas and Electric signed a contract with Solaren to procure up to 200 MW of electricity from the sun. Solaren plans to provide this electrical power to PG&E's customers from solar panels mounted on satellites placed in Earth's orbit. The satellite would convert this energy into radio waves and send it to a receiving station in Fresno County, California. The plan is to provide 200 megawatts of continuous power, estimated as the average usage of 150,000 homes. The schedule for completion is 2016.

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Solar-paint. A group in the United Kingdom is currently developing a PV energy producing paint. The paint is dye-sensitized to generate electricity which is then transferred to a collection circuit. The paint is not expected to be as efficient as the types of solar modules you see today – but it may be less expensive. It would be in the form of a liquid paste. The paint is designed to be used on architectural steel but it may also have automotive applications. The developers hope to have this product in commercial production by 2014.

Full spectrum PV. Full spectrum PV is currently in development. The advantage to full spectrum PV systems is that the generate electricity of a much wider spectrum of light that the current systems but in particular, they can generate electricity on cloudy days. A disadvantage for firefighters is that lighting from ambient light sources, including scene lighting, will cause the PV modules to produce electricity.



Like Solar-paint, PV glitter, or Microphotovoltaics, has the potential for a wide range of applications such as incorporating the material into an entire roof covering system or fabrics like clothes and tents to recharge portable electronics.

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Appendix A: Review of Solar Thermal

Solar thermal systems are similar to PV in that they may occupy roof space. Typical solar thermal systems are used to heat water to either low temperatures (like for a swimming pool), medium temperatures (for domestic water heating; space heating; space cooling; or a combination of all three), or high temperatures (to produce steam for electric generation). Most solar thermal systems located on homes and businesses are for pool heating or domestic hot water.

Solar Thermal Applications

Below is brief summary of some of the typical solar thermal systems that are seen in California.

Solar Pool Heating. These systems primarily use flexible plastic panels. Panels are usually 4'x10' and have long, small tubes which convey water from the pool through the panels. As the water moves through the panel it gets warm. The solar pool heater typically uses the pool filtration pump to circulate water from the swimming pool through the solar panels, although sometimes there is a booster pump to help move the water through the panels at the correct velocity for



heat collection. Individual panels are lightweight (less than 75 pounds). Multiple panels are connected together. Most systems will use enough panels to roughly equal one-half of the surface area of the swimming pool (a 20' by 30' swimming pool has a surface area of 600 square feet so a typical solar pool heating system would use about 300 square feet of solar panels). Plastic flexible panels can be cut through or easily removed for ventilation operations.

Solar Water Heating. Solar water heating is used to reduce the amount of energy needed to heat water for household uses (bathing, laundry, cleaning, and sanitation). In California, solar water heating systems can provide as much as 75% of the hot water needed for a typical single family home.



Solar water heating is used in residential, commercial, and agricultural applications. Solar water heating systems come in many configurations:

Thermosyphon systems: an insulated storage tank is located above the solar panels allowing natural convection of heat (heat rises) to move the heated water into the storage tank.

Integral Collector Storage: an un-insulated tank which heats water and has no back-up storage.

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Active systems: a system made up of one or more collectors and a storage tank. A pump is used to circulate heat transfer material through the collector back to the storage tank.

Note: both thermosyphon and integral collector storage systems add significant weight to the roof which should be of concern to firefighters.

Active systems use a variety of heat transfer materials: potable water, food-grade propylene glycol, or air. Systems that do not use water will include a heat exchanger to transfer the energy collected to the potable water in the storage tank.

Single family solar water heating systems typically use about 40-60 square feet of solar panels and they weigh less than 5 lbs/sq. ft (similar to PV) if they are not thermosyphon or integral collector storage systems.

Space conditioning. Space conditioning systems will typically be active systems designed to provide heat in the winter or air conditioning in the summer. Most, if not all of these systems, will produce more energy than is needed so they will use the extra energy to provide domestic hot water. All of these systems are custom designed and may be hooked to a radiant floor system or a radiator system. Space conditioning systems will usually use more overall square footage of solar panels than a system designed just to provide domestic hot water.

Solar Thermal Components

Typical components of a solar thermal system include:

Collector(s). Solar thermal collectors come in several forms:

- * A panel made up of risers attached to two manifolds. For low temperature applications (like pool heating) the panel is exposed to the elements. For low to medium temperature applications (domestic water heating and pool heating in cooler dimates), the panel is placed in an insulated aluminum box with a glass cover.
- A trough with a focal point where energy is collected.
- A plenum
- * A low profile tank

Tentage

Ten

Ther mosyphon Systems: where the heated water rises naturally from collector to storage tank.

Storage. Storage for solar thermal systems usually look like a typical household water heater. Larger systems may have larger custom storage tanks.

Pump. Not all systems have pumps but many have small recirculation pumps that turn on based on the temperature differential between the collector and the storage tank,

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Heat Exchanger. Not all systems have heat exchangers but many have them. Heat exchangers are located in the storage tank to transfer the energy collected from the solar panel and transfer it to the potable water in the storage tank.

Controller. A controller is used to monitor the temperature of the collector and the storage tank to control when the pump (if the system uses a pump). Low-voltage sensors are connected to the storage tank and the collectors.

Power block (for electric generation only). For systems that are used to generate electricity a power block will be attached to the solar thermal system to generate electricity. These systems are not currently seen anywhere except in utility scale applications.

Less Common Configurations

New solar thermal technologies are entering the market, in particular, combined solar thermal and PV systems. One approach to combine solar thermal and PV employs a plenum beneath the PV panel which is connected to a heat exchanger. Another approach is a system which uses focal mirrors to direct the sun's energy to one or more focal points (one for solar thermal and a second for PV).



Solar water heating can be found in conjunction with solar electric panels.

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Correspondence

Attention Deficit Hyperactivity Disorder and Dirty Electricity

To the Editor:

In February 2010, while studying a cancer cluster in teachers at a California elementary school, a fourth-grade teacher complained that her students were hyperactive and unteachable. The classroom levels of high-frequency voltage transients (dirty electricity) in the radio frequencies (RF) between 4 and 100 kHz measured in the outlets of her classroom with a Graham/Stetzer Microsurge meter were very high. Dirty electricity is a term coined by the electrical utilities to describe electrical pollution contaminating the 60 Hz electricity on the electrical grid. A cell phone tower on campus a few feet from this classroom and unshielded fluorescent lights both contributed to the electrical pollution in this room. Cell tower transmitters, like most modern electrical equipment, operate on direct current. The electrical current brought to the tower is alternating current that needs to be changed to direct current. This is done by a switching power supply. These devices interrupt the alternating current and are the likely major source of the dirty electricity in the classroom.

On a Friday afternoon after school, I filtered the 5 outlets in this room with Graham/Stetzer plug-in capacitive filters, reducing the measured

dirty electricity in the room wiring from more than 5000 Graham/Stetzer units to less than 50 units. With no change in either the lighting or the cell tower radiation, the teacher reported an immediate dramatic improvement in the behavior of her students in the following week. They were calmer, paid more attention, and were teachable all week except for Wednesday when they spent part of the day in the library.

In his 1973 book, Health and Light,1 John N. Ott described a 1973 study of 4 first-grade classrooms in a windowless Sarasota, Florida school. Two of the rooms had standard white fluorescent lighting and the other two had full-spectrum fluorescent lighting with a grounded aluminum wire screen to remove the RF radiation produced by fluorescent bulbs and ballasts. Concealed time-lapse cameras recorded student behavior in classrooms for 4 months.2 In the unshielded rooms, the first graders developed, "... nervous fatigue, irritability, lapses of attention, and hyperactive behavior." "... students could be observed fidgeting to an extreme degree, leaping from their seats, flailing their arms, and paying little attention to their teachers." In the RF-shielded rooms, "Behavior was entirely different. Youngsters were calmer and far more interested in their work."

The Old Order Amish live without electricity. A pediatric group practice in Jasper, Indiana, which cares for more than 800 Amish families has not diagnosed a single child with attention deficit hyperactivity disorder (ADHD).3 Dozens of cases of childhood ADHD have been "cured" with no further need for drugs by simply changing their electrical environments (Stetzer D, personal commu-AO:A nication [www.Stetzerelectric.com]).

Before children are treated with drugs for ADHD, the dirty electricity

I present the epidemiologic evidence linking dirty electricity to the other diseases of civilization in a recent book.4,5

Disclosure: The authors declare no AO:C conflict of interest.

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levels in their homes and school environments should first be examined and reduced if needed.

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AQ:F

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EXHIBIT 10

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AMERICAN JOURNAL OF INDUSTRIAL MEDICINE (2008)

A New Electromagnetic Exposure Metric: High Frequency Voltage Transients Associated With Increased Cancer Incidence in Teachers in a California School

Samuel Milham, MD, MPH*,† and L. Lloyd Morgan, BS[‡]

Background In 2003 the teachers at La Quinta, California middle school complained that they had more cancers than would be expected. A consultant for the school district denied that there was a problem.

Objectives To investigate the cancer incidence in the teachers, and its cause.

Method We conducted a retrospective study of cancer incidence in the teachers' cohort in relationship to the school's electrical environment.

Results Sixteen school teachers in a cohort of 137 teachers hired in 1988 through 2005 were diagnosed with 18 cancers. The observed to expected (O/E) risk ratio for all cancers was 2.78 (P=0.000098), while the O/E risk ratio for malignant melanoma was 9.8 (P=0.0008). Thyroid cancer had a risk ratio of 13.3 (P=0.0098), and uterine cancer had a risk ratio of 9.2 (P=0.019). Sixty Hertz magnetic fields showed no association with cancer incidence. A new exposure metric, high frequency voltage transients, did show a positive correlation to cancer incidence. A cohort cancer incidence analysis of the teacher population showed a positive trend ($P=7.1\times10^{-10}$) of increasing cancer risk with increasing cumulative exposure to high frequency voltage transients on the classroom's electrical wiring measured with a Graham/Stetzer (G/S) meter. The attributable risk of cancer associated with this exposure was 64%. A single year of employment at this school increased a teacher's cancer risk by 21%.

Conclusion The cancer incidence in the teachers at this school is unusually high and is strongly associated with high frequency voltage transients, which may be a universal carcinogen, similar to ionizing radiation. Am. J. Ind. Med. 2008. © 2008 Wiley-Liss, Inc.

KEY WORDS: high frequency voltage transients; electricity; dirty power; cancer; school teachers; carcinogen

Abbreviations: EMF, electromagnetic fields; 0, observed cases; E, expected cases; 0/E, risk ratic; p, probability; Hz, Hertz or cycles per second; 0SHA, Occupational Safety and Health Administration; 0CMAP, occupational mortality analysis program; AM, amplitude modulation; GS units, Graham/Stetzer units; G/S meter, Graham/Stetzer meter; MS II, Microsurge II meter; mG, milligauss; EKG, electrocardiogram; LQMS, La Quinta Middle School.

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BACKGROUND

Since the 1979 Wertheimer–Leeper study [Wertheimer and Leeper, 1979] there has been concern that exposure to power frequency (50/60 Hz) EMFs, especially magnetic fields, may contribute to adverse health effects including cancer. Until now, the most commonly used exposure metric has been the time-weighted average of the power-frequency magnetic field. However, the low risk ratios in most studies suggest that magnetic fields might be a surrogate for a more important metric. In this paper we present evidence that a

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new exposure metric, high frequency voltage transients existing on electrical power wiring, is an important predictor of cancer incidence in an exposed population.

The new metric, GS units, used in this investigation is measured with a Graham/Stetzer meter (G/S meter) also known as a Microsurge II meter (MS II meter), which is plugged into electric outlets [Graham, 2005]. This meter displays the average rate of change of these high frequency voltage transients that exist everywhere on electric power wiring. High frequency voltage transients found on electrical wiring both inside and outside of buildings are caused by an interruption of electrical current flow. The electrical utility industry has referred to these transients as "dirty power."

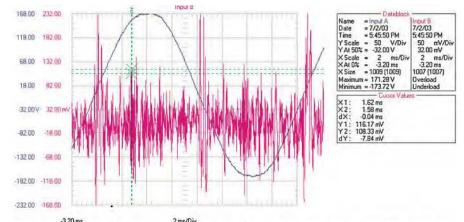
There are many sources of "dirty power" in today's electrical equipment. Examples of electrical equipment designed to operate with interrupted current flow are light dimmer switches that interrupt the current twice per cycle (120 times/s), power saving compact fluorescent lights that interrupt the current at least 20,000 times/s, halogen lamps, electronic transformers and most electronic equipment manufactured since the mid-1980s that use switching power supplies. Dirty power generated by electrical equipment in a building is distributed throughout the building on the electric wiring. Dirty power generated outside the building enters the building on electric wiring and through ground rods and

conductive plumbing, while within buildings, it is usually the result of interrupted current generated by electrical appliances and equipment.

Each interruption of current flow results in a voltage spike described by the equation $V = L \times di/dt$, where V is the voltage, L is the inductance of the electrical wiring circuit and di/dt is the rate of change of the interrupted current. The voltage spike decays in an oscillatory manner. The oscillation frequency is the resonant frequency of the electrical circuit. The G/S meter measures the average magnitude of the rate of change of voltage as a function of time (dV/dT). This preferentially measures the higher frequency transients. The measurements of dV/dT read by the meter are defined as GS (Graham/Stetzer) units.

The bandwidth of the G/S meter is in the frequency range of these decaying oscillations. Figure 1 shows a two-channel oscilloscope display. One channel displays the 60 Hz voltage on an electrical outlet while the other channel with a 10 kHz hi-pass filter between the oscilloscope and the electrical outlet, displays the high frequency voltage transients on the same electrical outlet [Havas and Stetzer, 2004, reproduced with permission].

Although no other published studies have measured high frequency voltage transients and risk of cancer, one study of electric utility workers exposed to transients from pulsed



THE WAVEFORM WAS COLLECTED IN ROOM 114 AT THE ELGIN/MILLVILLE MN HIGH SCHOOL. CHANNEL 1 WAS CONNECTED TO THE 120 VAC UTILITY SUPPLIED POWER RECEPTACLE. CHANNEL 2 WAS CONNECTED TO THE SAME POTENTIAL, EXCEPT THROUGH THE GRAHAM UBIQUITOUS FILTER. (REMOVES THE 60 HERTZ) THE AREA BETWEEN THE CURSORS REPRESENTS A FREQUENCY OF 25 KILO HERTZ. A TEACHER WHO PREVIOUSLY OCCUPIED THE ROOM DIED OF BRAIN TUMORS AND THE TEACHER IN THE ADJOINING ROOM DIED OF LUEKEMIA.

FIGURE 1. Oscilloscope display of dirty power: 60 Hz electrical power (channel 1) with concurrent high frequency voltage transients (channel 2). A 10 kHz hi-pass filter was used on channel 2 in order to filter out the 60 Hz voltage and its harmonics. [Color figure can be viewed in the online is sue, which is available at www.interscience.wiley.com.]

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electromagnetic fields found an increased incidence of lung cancer among exposed workers [Armstrong et al., 1994].

INTRODUCTION

In February 2004, a Palm Springs, California newspaper, The Desert Sun, printed an article titled, "Specialist discounts cancer cluster at school," in which a local tumor registry epidemiologist claimed that there was no cancer cluster or increased cancer incidence at the school [Perrault, 2004]. An Internet search revealed that the teacher population at La Quinta Middle School (LQMS) was too small to generate the 11 teachers with cancer who were reported in the article. The school was opened in 1988 with 20 teachers hired that year. For the first 2 years, the school operated in three temporary buildings, one of which remains. In 1990, a newly constructed school opened. In 2003, the teachers complained to school district management that they believed that they had too many cancers. Repeated requests to the school administration for physical access to the school and for teachers' information were denied. We contacted the teachers, and with their help, the cancers in the group were characterized. One teacher suggested using yearbooks to develop population-at-risk counts for calculating expected cancers. We were anxious to assess the electrical environment at the school, since elevated power frequency magnetic field exposure with a positive correlation between duration of exposure and cancer incidence had been reported in first floor office workers who worked in strong magnetic fields above three basement-mounted 12,000 V transformers [Milham, 1996]. We also wanted to use a new electrical measurement tool, the Graham/Stetzer meter, which measures high frequency voltage transients.

The Graham/Stetzer Microsurge II meter measures the average rate of change of the transients in Graham/Stetzer units (GS units). Anecdotal reports had linked dirty power exposure with a number of illnesses [Havas and Stetzer, 2004]. We decided to investigate whether power frequency magnetic field exposure or dirty power exposure could explain the cancer increase in the school teachers.

METHODS

After the school administration (Desert Sands Unified School District) had refused a number of requests to assist in helping us evaluate the cancers reported by the teachers, we were invited by a teacher to visit the school after hours to make magnetic field and dirty power measurements. During that visit, we noted that, with the exception of one classroom near the electrical service room, the classroom magnetic field levels were uniformly low, but the dirty power levels were very high, giving many overload readings. When we reported this to Dr. Doris Wilson, then the superintendent of schools (retired December, 2007), one of us (SM) was threatened

with prosecution for "unlawful.. trespass," and the teacher who had invited us into the school received a letter of reprimand. The teachers then filed a California OSHA complaint which ultimately lead to a thorough measurement of magnetic fields and dirty power levels at the school by the California Department of Health Services which provided the exposure data for this study. They also provided comparison dirty power data from residences and an office building, and expedited tumor registry confirmation of cancer cases.

Classrooms were measured at different times using 3 meters: an FW Bell model 4080 tri-axial Gaussmeter, a Dexsil 310 Gaussmeter, and a Graham-Stetzer (G/S) meter. The Bell meter measures magnetic fields between 25 and 1,000 Hz. The Dexsil meter measures magnetic fields between 30 and 300 Hz. The G/S meter measures the average rate of change of the high frequency voltage transients between 4 and 150 KHz.

All measurements of high frequency voltage transients were made with the G/S meter. This meter was plugged into outlets, and a liquid crystal display was read. All measurements reported were in GS units. The average value was reported where more than one measurement was made in a classroom.

We measured seven classrooms in February 2005 using the Bell meter and the G/S meter. Later in 2005, the teachers measured 37 rooms using the same meters. On June 8, 2006, electrical consultants for the school district and the California Department of Health Services (Dr. Raymond Neutra) repeated the survey using the G/S meter and a Dexsil 320 Gaussmeter, measuring 51 rooms. We used results of this June 8, 2006 sampling in our exposure calculations, since all classrooms were sampled, multiple outlets per room were sampled, and an experienced team did the sampling. Additionally, GS readings were taken at Griffin Elementary school near Olympia, Washington, and Dr. Raymond Neutra provided GS readings for his Richmond California office building and 125 private California residences measured in another Northern California study.

All the cancer case information was developed by personal, telephone, and E-mail contact with the teachers or their families without any assistance from the school district. The local tumor registry verified all the cancer cases with the exception of one case diagnosed out of state and the two cases reported in 2007. The out-of state case was verified by pathologic information provided by the treating hospital. The teachers gathered population-at-risk information (age at hire, year of hire, vital status, date of diagnosis, date of death, and termination year) from yearbooks and from personal contact. The teachers also provided a history of classroom assignment rosters (academic years 1990–1991 to 2006–2007) generated by the school administration. The school administration provided a listing of school employees, including

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the teachers, to the regional tumor registry after the teachers involved the state health agency by submitting an OSHA complaint. The information we obtained anecdotally from the teachers, yearbooks, and classroom assignment rosters was nearly identical to that given to the tumor registry. None of the cancer cases were ascertained initially through the cancer registry search.

Published cancer incidence rates by age, sex, and race for all cancers, as well as for malignant melanoma, thyroid, uterine, breast, colon, ovarian cancers, and non-Hodgkin's lymphoma (NHL) were obtained from a California Cancer Registry publication [Kwong et al., 2001]. We estimated the expected cancer rate for each teacher by applying year, age, sex, and race-specific cancer incidence rates from hire date until June 2007, or until death. We then summed each teacher's expected cancer rate for the total cohort.

Using the California cancer incidence data, the school teacher data, and the GS exposure data, we calculated cancer incidence and risks. A replicate data set was sent to Dr. Gary Marsh and to Mike Cunningham at the University of Pittsburgh School of Public Health for independent analysis using OCMAP software. We calculated cancer risk ratios by duration of employment and by cumulative GS unit-years of exposure. We calculated an attributable risk percent using the frequencies of total observed and expected cancers, and performed trend tests [Breslow and Day, 1987] for cancer risk versus duration of employment and cumulative GS unit-years of exposure. Poisson P values were calculated using the Stat Trek website (Stat Trek, 2007). We also performed a linear regression of cancer risk by duration of employment in years and by time-weighted exposure in GS unit-years.

Since neither author had a current institutional affiliation, institutional review board approval was not possible. The teachers requested the study, and their participation in the study was both voluntary and complete. All the active teachers at the school signed the Cal OSHA request. The authors fully explained the nature of the study to study participants and offered no remuneration to the teachers for participation in the study. The authors maintained strict confidentiality of all medical and personal information provided to us by the teachers, and removed personal identifiers from the data set which was analyzed by the University of Pittsburgh. Possession of personal medical

information was limited to the two authors. No patient-specific information was obtained from the tumor registry. With the individual's permission we provided the registry with case information for a teacher with malignant melanoma diagnosed out of state. The exposure information was provided by the California Department of Health Services. The basic findings of the study were presented to the Desert Sands Unified School District School Board and at a public meeting arranged by the teachers.

RESULTS

Electrical Measurements

In our seven-room survey of the school in 2005, magnetic field readings were as high as 177 mG in a classroom adjacent to the electrical service room. A number of outlets had overload readings with the G/S meter. Magnetic fields were not elevated (>3.0 mG) in the interior space of any of the classrooms except in the classroom adjacent to the electrical service room, and near classroom electrical appliances such as overhead transparency projectors. There was no association between the risk of cancer and 60 Hz magnetic field exposures in this cohort, since the classroom magnetic field exposures were the same for teachers with and without cancer (results not shown).

This school had very high GS readings and an association between high frequency voltage transient exposure in the teachers and risk of cancer. The G/S meter gives readings in the range from 0 to 1,999 GS units. The case school had 13 of 51 measured rooms with at least one electrical outlet measuring "overload" (≥2,000 GS units). These readings were high compared to another school near Olympia Washington, a Richmond California office building, and private residences in Northern California (Table I). Altogether, 631 rooms were surveyed for this study. Only 17 (2.69%) of the 631 rooms had an "overload" (maximum, ≥2,000 GS units) reading. Applying this percentage to the 51 rooms surveyed at the case school, we would expect 1.4 rooms at the school to have overload GS readings $(0.0269 \times 51 = 1.37)$. However, thirteen rooms (25%) measured at the case school had "overload" measurements above the highest value (1,999 GS units) that the G/S meter can

TABLE 1. Graham/Stetzer Meter Readings: Median Values in Schools, Homes and an Office Building

Place	Homes	Office bldg	Olympia WA School	LQMS	Total
No. of rooms surveyed	500	39	41	51	531
Median GS units	159	210	160	750	<270°
Rooms with overload GS units (≥2,000)	4	0	0	13*	17

^aExcludes homes as specific room data was not available.

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 $^{^*}P = 3.14 \times 10^{-9}$.

TABLE II. Risk of Cancer by Type Among Teachers at La Quinta Middle School

Cancer	Observed	Expected	Risk ratio (O/E)	<i>P</i> -value
All cancers	18	6.51	2.78*	0.000098
Malignantmelanoma	4	0.41	9.76*	0.0008
Thyroid cancer	2	0.15	13.3*	0.011
Uterus cancer	2	0.22	9.19*	0.019
Female breast cancer	2	1.5	1.34	0.24
All cancers less melanoma	14	6.10	2.30*	0.0025

^{*} $P \le 0.05$.

measure. This is a highly statistically significant excess over expectation (Poisson $P=3.14\times 10^{-9}$).

We noticed AM radio interference in the vicinity of the school. A teacher also reported similar radio interference in his classroom and in the field near his ground floor classroom. In May 2007, he reported that 11 of 15 outlets in his classroom overloaded the G/S meter. An AM radio tuned off station is a sensitive detector of dirty power, giving a loud buzzing noise in the presence of dirty power sources even though the AM band is beyond the bandwidth of the G/S meter.

Cancer Incidence

Three more teachers were diagnosed with cancer in 2005 after the first 11 cancer diagnoses were reported, and another former teacher (diagnosed out-of-state in 2000) was reported by a family member employed in the school system. One cancer was diagnosed in 2006 and two more in 2007. In the years 1988-2005, 137 teachers were employed at the school. The 18 cancers in the 16 teachers were: 4 malignant melanomas, 2 female breast cancers, 2 cancers of the thyroid, 2 uterine cancers and one each of Burkitt's lymphoma (a type of non-Hodgkins lymphoma), polycythemia vera, multiple myeloma, leiomyosarcoma and cancer of the colon, pancreas, ovary and larynx. Two teachers had two primary cancers each: malignant melanoma and multiple myeloma, and colon and pancreatic cancer. Four teachers had died of cancer through August 2007. There have been no non-cancer deaths to date.

The teachers' cohort accumulated 1,576 teacher-years of risk between September 1988 and June 2007 based on a 12-month academic year. Average age at hire was 36 years. In 2007, the average age of the cohort was 47.5 years.

When we applied total cancer and specific cancer incidence rates by year, age, sex, race, and adjusted for cohort ageing, we found an estimate of 6.5 expected cancers, 0.41 melanomas, 0.15 thyroid cancers, 0.22 uterine cancers, and 1.5 female breast cancers (Table II). For all cancers, the risk ratio (Observed/Expected = 18/6.5) was 2.78 (P = 0.00098, Poisson test); for melanoma, (O/E = 4/0.41) was 9.8 (P = 0.0008, Poisson test); for thyroid cancer (O/E = 2/0.15) was 13.3 (P = 0.0011, Poisson test); for uterine cancer (O/E = 2/0.22), was 9.19 (P = 0.019, Poisson test).

Table III shows the cancer risk among the teachers by duration of employment. Half the teachers worked at the school for less than 3 years (average 1.52 years). The cancer risk increases with duration of employment, as is expected when there is exposure to an occupational carcinogen. The cancer risk ratio rose from 1.7 for less than 3 years, to 2.9 for 3-14 years, to 4.2 for 15+ years of employment. There was a positive trend of increasing cancer incidence with increasing duration of employment ($P=4.6\times10^{-10}$). A single year of employment at this school increases a teacher's risk of cancer by 21%.

Using the June 8, 2006 survey data (Table IV), the cancer risk of a teacher having ever worked in a room with at least one outlet with an overload GS reading (\geq 2000 GS units) and employed for 10 years or more, was 7.1 (P=0.00007, Poisson test). In this group, there were six teachers diagnosed

TABLE III. Cancer Risk by Duration of Employment

				Cancer	Cancer		
Time at school	Average time	Teachers	% of teachers	observed	expected	Risk ratio (O/E)	Poisson p
<3 years	1.52 years	68	49.6	4	2.34	1.72	0.12
3-14 years	7.48 years	56	40.9	9	3.14	2.87*	0.0037
15+ years	16.77 years	12	8.8	5	1.02	4.89*	0.0034
Total		137	100	18	6.51	2.78*	0.000098

Positive trend test (Chi square with one degree of freedom = 38.8, $P = 4.61 \times 10^{-10}$).

 $^{^*}P \le 0.05.$

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TABLE IV. Cancer in Teachers Who Ever Taught in Classrooms With at Least One Overload GS Reading (>2000 GS Units) by Duration of Employment

Ever in a room > 2,000 GS units	Employed 10 + years	Total teachers	Cancers observed	Cancers expected	Risk ratio (O/E)	Poisson p
Yes	Yes	10	7ª	0.988	7.1*	0.00007
Yes	No	30	3ª	0.939	3.2	0.054
Total		40	10	1.93	5.1*	0.00003
No	Yes	19	2	1.28	1.6	0.23
No	No	78	6	3.25	1.8	0.063
Total		97	8	4.56	1.8*	0.047
Grand total		137	18	6.49	2.8*	0.000098

^aOne teacher had two primary cancers.

with a total of seven cancers, and four teachers without a cancer diagnosis, who were employed for 10 or more years and who ever worked in one of these rooms. Five teachers had one primary cancer and one teacher had two primary cancers. These teachers made up 7.3% of the teachers' population (10/ 137) but had 7 cancers or 39% (7/18) of the total cancers. The 10 teachers who worked in an overload classroom for 10 years or more had 7 cancers when 0.99 would have been expected ($P = 6.8 \times 10^{-5}$ Poisson test). The risk ratio for the 8 teachers with cancer and 32 teachers without cancer, who ever worked in a room with an overload GS reading, regardless of the time at the school, was 5.1 (P = 0.00003, Poisson test). The risk ratio for 8 teachers with cancer and 89 teachers without cancer who never worked in a room with an overload G-S reading was 1.8 (P = 0.047, Poisson test). Teachers who never worked in an overload classroom also had a statistically significantly increased risk of cancer.

A positive dose-response was seen between the risk of cancer and the cumulative GS exposure (Table V). Three categories of cumulative GS unit-years of exposure were selected: <5,000, 5,000 to 10,000, and more than 10,000 cumulative GS unit-years. We found elevated risk ratios of 2.0, 5.0, and 4.2, respectively, all statistically significant, for each category. There was a positive trend of increasing cancer

incidence with increasing cumulative GS unit-years of exposure $(P=7.1\times 10^{-10})$. An exposure of 1,000 GS unit-years increased a teacher's cancer risk by 13%. Working in a room with a GS overload (\geq 2,000 GS units) for 1 year increased cancer risk by 26%.

An attributable risk percentage was calculated: (observed cancers-expected cancers)/observed cancers = (18-6.51)/18 = 63.8%.

The fact that these cancer incidence findings were generated by a single day of G/S meter readings made on June 8, 2006 suggests that the readings were fairly constant over time since the school was built in 1990. For example, if the 13 classrooms which overloaded the meter on June 8, 2006 were not the same since the start of the study and constant throughout, the cancer risk of teachers who ever worked in the overload rooms would have been the same as the teachers who never worked in an overload room.

Although teachers with melanoma and cancers of the thyroid, and uterus, had very high, statistically significant risk ratios, there was nothing exceptional about their age at hire, duration of employment, or cumulative GS exposure. However, thyroid cancer and melanoma had relatively short latency times compared to the average latency time for all 18 cancers. The average latency time between start of

TABLE V. Observed and Expected Cancers by Cumulative GS Exposure (GS Unit-Years)

Exposure group	< 5,000 GS unit-years	5,000 to 10,000	>10,000 GS unit-years	Total
Average GS unit-years	914	7,007	15,483	
Cancers obs.	9	4	5	18
Cancers exp.	4.507	0.799	1.20	6.49
Riskratio (0/E)	2.01*	5.00*	4.17*	2.78*
Poisson p	0.0229	0.0076	0.0062	0.000098

Positive trend test (Chi square with one degree of freedom = 38.0, $P = 7.1 \times 10^{-10}$).

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^{*}P < 0.05.

 $^{^*}P < 0.05.$

employment at the school and diagnosis for all cancers was 9.7 years. The average latency time for thyroid cancer was 3.0 years and for melanoma it was 7.3 years (with three of the four cases diagnosed at 2, 5, and 5 years).

An independent analysis of this data set by the University of Pittsburgh School of Public Health using OCMAP software supported our findings.

DISCUSSION

Because of access denial, we have no information about the source, or characterization of the high frequency voltage transients. We can assume, because the school uses metal conduit to contain the electrical wiring, that any resultant radiated electric fields from these high frequency voltage transients would radiate mainly from the power cords and from electrical equipment using the power cords within a classroom.

The school's GS readings of high frequency voltage transients are much higher than in other tested places (Table I). Also, teachers in the case school who were employed for over 10 years and who had ever worked in a room with an overload GS reading had a much higher rate of

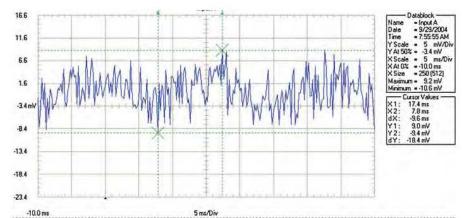
cancer. They made up 7.3% of the cohort but experienced 39% of all cancers.

The relatively short latency time of melanoma and thyroid cancers suggests that these cancers may be more sensitive to the effects of high frequency voltage transients than the other cancers seen in this population.

In occupational cohort studies, it is very unusual to have a number of different cancers with an increased risk. An exception to this is that cohorts exposed to ionizing radiation show an increased incidence of a number of different cancers. The three cancers in this cohort with significantly elevated incidence, malignant melanoma, thyroid cancer and uterine cancer, also have significantly elevated incidence in the large California school employees cohort [Reynolds et al., 1999].

These cancer risk estimates are probably low because 23 of the 137 members of the cohort remain untraced. Since exposure was calculated based on 7 days a week for a year, this will overstate the actual teachers' exposure of 5 days a week for 9 months a year.

We could not study field exposures in the classrooms since we were denied access to the school. We postulate that the dirty power in the classroom wiring exerted its effect by capacitive coupling which induced electrical currents in the



The waveform was recorded between 2 EKG patches placed on the ankles of XXXXXX XXXXXXXXX standing in front of his kitchen sink at his home near Bright Ontario. It shows a distorted 60 cycle sine wave containing high frequencies applied to each foot, allowing high frequency current to freely oscillate up one leg and down the other. XXXXXX has been diagnosed with prostrate cancer since moving to the house in less than a year. He was standing with feet shoulder width apart, wearing shoes, at the time of the readings. The amplitude increased as the feet were placed farther apart.

FIGURE 2. Oscilliscope display of 6.0 Hz current distorted with high frequencies taken between EKB patches applied to the ankles of a man standing with shoes on at a kitchen sink. [Color figure can be viewed in the online issue, which is available at www.interscience. wiley.com.]

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teachers' bodies. The energy that is capacitively coupled to the teachers' bodies is proportional to the frequency. It is this characteristic that highlights the usefulness of the G/S meter. High frequency dirty power travels along the electrical distribution system in and between buildings and through the ground. Humans and conducting objects in contact with the ground become part of the circuit. Figure 2 [Havas and Stetzer, 2004, reproduced with permission] shows an oscilloscope tracing taken between EKG patches on the ankles of a man wearing shoes, standing at a kitchen sink. The 60 Hz sine wave is distorted by high frequencies, which allows high frequency currents to oscillate up one leg and down the other between the EKG patches.

Although not demonstrated in this data set, dirty power levels are usually higher in environments with high levels of 60 Hz magnetic fields. Many of the electronic devices which generate magnetic fields also inject dirty power into the utility wiring. Magnetic fields may, therefore, be a surrogate for dirty power exposures. In future studies of the EMF-cancer association, dirty power levels should be studied along with magnetic fields.

The question of cancer incidence in students who attended La Quinta Middle School for 3 years has not been addressed.

CONCLUSION

The cancer incidence in the teachers at this school is unusually high and is strongly associated with exposure to high frequency voltage transients. In the 28 years since electromagnetic fields (EMFs) were first associated with cancer, a number of exposure metrics have been suggested. If our findings are substantiated, high frequency voltage transients are a new and important exposure metric and a possible universal human carcinogen similar to ionizing radiation.

ACKNOWLEDGMENTS

The authors would like to thank The La Quinta, California middle school teachers, especially Gayle Cohen. Thanks also to Eric Ossiander, Dr. Raymond Neutra, Dr. Gary Marsh and Mike Cunningham and Dr. Louis Slesin. LM thanks Diana Bilovsky for editorial assistance.

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Letter D Law Offices of Stephan C. Volker February 10, 2022

- **D.1** This is an introductory comment and provides a summary of the proposed project. This comment also expresses opposition to the proposed project due to alleged conversion of farmland to solar farm projects. See responses to comments D.4 and D.5 for specific responses to potential impacts on agricultural resources.
- **D.2** This comment states that the County should abide by its own policy and not approve any additional renewable energy developments that are proposed outside the Renewable Energy (RE) Overlay Zone that would have significant environmental impacts.

The County acknowledges that the southern portion of the proposed project site is currently located outside the RE Overlay Zone (see page 2-4 and Figure 2-1 of the Draft EIR). As explained in Chapter 2 of the Draft EIR, approval by the Board of Supervisors of a General Plan Amendment and Rezone would be required for project implementation. However, it is also noted that the northern parcels of the proposed project site are currently located within the Geothermal Overlay Zone (see Draft EIR page 3.11-4), which is a renewable energy source. According to the the County Land Use Ordinance, Division 17: Renewable Energy Resources, §91701.01 "RE" RENEWABLE ENERGY OVERLAY ZONE, "The Renewable Energy (RE) Overlay Zone consists of two categories as shown on the RE Overlay Map: 1) the Geothermal Energy overlay for areas where existing and future develoment has been environmentally review[ed] for geotheremal renewable energy facilities; and 2) the Renewable/Geothermal overlay for areas that could be developed with any form of renewable energy technology, including geothermal production." Therefore, the project site is located adjacent to an existing RE Overlay Zone. Further, the existing project site zoning (A-2), allows for "solar energy electrical generator, battery storage facility, electrical substations, communication towers, and facilities for the transmission of electrical energy."

The County Land Use Ordinance, Division 17, includes the RE Overlay Zone, which authorizes the development and operation of renewable energy projects with an approved conditional use permit (CUP). The RE Overlay Zone is concentrated in areas determined to be the most suitable for the development of renewable energy facilities while minimizing the impact on other established uses. CUP applications proposed for specific renewable energy projects not located in the RE Overlay Zone would not be allowed without an amendment to the RE Overlay Zone, and as stated in the Renewable Energy and Transmission Element:

CUP applications proposed for specific renewable energy projects not located in the RE Overlay Zone would not be allowed without an amendment to the RE Overlay Zone. An amendment to the overlay zone would only be approved by the County Board of Supervisors if a future renewable energy project met one of the following two conditions:

 Adjacent to the Existing RE Overlay Zone: An amendment may be made to allow for development of a future renewable energy project located adjacent to the existing RE Overlay Zone if the project:

o Is not located in a sensitive area

- o Would not result in any significant impacts
- 2) "Island Overlay": An amendment may be made to allow for development of a future renewable energy project that is not located adjacent to the existing RE Overlay Zone if the project:
 - o Is located adjacent (sharing a common boundary) to an existing transmission source
 - o Consists of the expansion of an existing renewable energy operation
 - o Would not result in any significant environmental impacts.

The project site is located adjacent to an existing RE Overlay Zone; and the project meets the criteria for an amendment to the overlay zone as the project site is not located in a sensitive area, and would not result in any significant impacts after implementation of proposed mitigation. EIR pages 2-4 and 3.11-4 have been modified to clarify that the northern portion of the project site is within an existing RE Overlay Zone and that the southern portion of the site is adjacent to an existing RE Overlay Zone.

Additionally, the project is located adjacent to an existing transmission source. The project also meets the criteria identified for the "Island Overlay" that is necessary to obtain approval of an amendment to the RE Overlay Zone. An analysis of the project's consistency with the "Island Overlay" criteria is provided in Table 3.11-3 of the Draft EIR. As shown on Table 3.11-3 of the Draft EIR, the proposed project would also meet the "Island Overlay" criteria because it is located adjacent to an existing transmission source, would expand an existing renewable energy operation, and would not result in any significant environmental impacts with implementation of mitigation measures. With the approval of the General Plan Amendment, Zone Change, and CUP, the proposed solar project can be implemented.

The commenter encourages the County to adopt an alternative to the proposed project that would involve distributed PV generation projects near energy demand centers in already-disturbed areas. The Draft EIR provides an analysis of a distributed energy alterantive (see Draft EIR Alternative 4 – Distributed Commercial and Industrial Rooftop Solar Only Alternative), which would involve the development of distributed small to medium solar PV systems within existing developed areas, typically on the rooftops of commercial and industrial facilities throughout Imperial County. As addressed in the Draft EIR (see page 7-23), the Distributed Commercial and Industrial Rooftop Solar Only Alternative would avoid impacts on agricultural resources compared to the proposed project; however, it would result in greater environmental impacts to other environmental resources related to aesthetics, air quality, biological resources, cultural resources, tribal cultural resources, and utilities and service systems.

D.3 This comment indicates that the project is inconsistent with the County's General Plan based on precedent established in the court case "Neighborhood Action Group v. County of Calaveras" (1984) 156 Cal. App.3d 1176, 1184. In that case, the County of Calaveras approved a conditional use permit (CUP) for a proposed project, but the County did not have a valid General Plan (i.e., the General Plan was determined not to be in compliance with State law). This, in turn, invalidated the County's issuance of a CUP for the project. The circumstances regarding the Neighborhood Action Group v. County of Calaveras case are not applicable to the Brawley Solar Energy Facility project. Unlike the "Neighborhood" case, the County of Imperial's General Plan meets State requirements and is legally valid. As such, no

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defect exists as it relates to the County's authority to issue a CUP for the proposed solar generation project, consistent with the underlying zoning designation within the project site. Moreover, in a recent trial court case in the County of Imperial (Campoverde) a judge found that solar farms are consistent with the County's adopted General Plan.

Specifically with respect to the proposed project, as indicated on page 3.11-16 of the Draft EIR:

Development of the solar energy facility and supporting infrastructure is subject to the County's zoning ordinance. The solar energy facility is located on five privately-owned legal parcels zoned A-2-G. Pursuant to Title 9, Division 5, Chapter 8 the following uses are permitted in the A-2 zone subject to approval of a CUP from Imperial County: solar energy electrical generator, battery storage facility, and facilities for the transmission of electrical energy (County of Imperial 2020). Therefore, with approval of a CUP, the proposed project would not conflict with the County's zoning ordinance.

One of the Court's primary considerations in the "Neighborhood" case was whether the County of Calaveras had the authority to issue a CUP if it had failed to adopt a general plan containing elements, required by state law, which are relevant to the uses authorized by the permit. The County of Imperial's General Plan Land Use Element recognizes solar energy (an alternative form of energy) as being consistent with the County's overall goals and energy policies. Development of Geothermal/Alternative Energy Resources. Goal 1 - the County of Imperial supports and encourages the full, orderly, and efficient development of geothermal/alternative energy resources while at the same time preserving and enhancing where possible agricultural, biological, human, and recreational resources.

Further, as discussed in response to comment D.2, the project site is located adjacent to an existing RE Overlay Zone; and the project meets the criteria for an amendment to the overlay zone as the project site is not located in a sensitive area, and would not result in any significant impacts after implementation of proposed mitigation.

In addition, Table 3.11-3 (EIR page 3.11-15) analyzes the Project Consistency with the "Island Overlay" criteria. As described in Response to Comment D.2, the proposed project meets the "Island Overlay" criteria because it is located adjacent to an existing transmission source, would expand an existing renewable energy operation, and would not result in any significant environmental impacts with implementation of mitigation measures. With the approval of the General Plan Amendment, Zone Change, and CUP, the proposed project would be an allowable use within the existing land use and zoning designations for the site. In addition, the project would promote Imperial County's renewable energy policies and would be consistent with the County's goal, as stated in its April 20, 2010 proclamation. According to the April 28, 2009 Joint Resolution of Imperial County Irrigation District and County of Imperial for the Creation of an Imperial Valley Renewable Energy Development Program, Imperial County is a major source of renewable energy for the State of California.

D.4 This comment incorrectly states an interpretation of the General Plan that it "forbids" the proposed solar farm use on the proposed project site. While the County's General Plan Land Use Agriculture category states that "agriculture shall be promoted as the principal and dominate use"; the Element does not restrict or otherwise forbid other uses. Moreover, agricultural uses continue to be the principal dominate use in the County. As provided in the

Land Use Element, conversion of agricultural uses is allowed in cases "where a clear long term economic benefit to the County can be demonstrated through the planning and environmental review process." The potential economic benefits of the proposed project will be considered by the Planning Commission and Board of Supervisors as part of consideration of approval of the proposed project, consistent with this particular provision of the General Plan.

CUPs for solar energy projects on agriculturally-zoned land are not expressly prohibited in the Imperial County General Plan. Although each conditional use permit application must be evaluated on a case-by-case basis, such conditional uses are not inherently inconsistent with the General Plan Agricultural Element or Land Use Element. The Agricultural Element and Land Use Element contain no express prohibition of non-agricultural uses on land designated within the Agricultural category. Rather, the Agricultural Element specifically allows nonagricultural development on land within the Agricultural Category. According to the Land Use Element, the "Agriculture" land use designation expressly allows non-agricultural uses on agricultural land and places an appropriate burden on those proposing a non-agricultural use to demonstrate that (1) it "does not conflict with agricultural operations and will not result in the premature elimination of such agricultural operations" and (2) it meets the requirement that "no use should be permitted which would have a significant adverse effect on agricultural production." (ICGP Land Use Elem. IV.C.1.) The Lead Agency has the authority to interpret the meaning of the General Plan and determine whether the proposed project, together with the mitigation measures set forth in the EIR and the conditions of approval mandated by a CUP, are consistent with the General Plan. Please also refer to response to comment D.2 related to the project's consistency with the RE Overlay Zone.

D.5 Please refer to response to comment D.2 as it related to the project's overall consistency with the County's Renewable Energy and Transmission Element. In addition, it should be noted that the proposed project does not involve a re-designation of the underlying Agriculture land use of the project site. General Plan goals and policies for preserving agricultural land are not inflexible and, pursuant to the language in the General Plan, should be balanced with General Plan goals and objectives of economic growth and regional vision. The General Plan Agricultural Element specifically cautions against its Goals and Policies being interpreted as doctrine:

Imperial County's Goals and Objectives are intended to serve as long-term principles and policy statements representing ideals which have been determined by the citizens as being desirable and deserving of community time and resources to achieve. The Goals and Objectives, therefore, are important guidelines for agricultural land use decision making. It is recognized, however, that other social, economic, environmental, and legal considerations are involved in land use decisions and that these [Agricultural Element] Goals and Objectives, and those of other General Plan Elements, should be used as guidelines but not doctrines. (ICGP Ag. Elem. III.A Preface [emphasis added].)

In addition to the considerations set forth in the Agricultural Element regarding non-agricultural use of land within the Agricultural category, preserving Agricultural land for agricultural use must be balanced against the Economic Growth and Regional Vision goals and objectives of the General Plan Land Use Element.

In particular, Goal 2 states: "Diversify employment and economic opportunities in the County while preserving agricultural activity." Goal 3, Objective 3.2 states: "Preserve agricultural and

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natural resources while promoting diverse economic growth through sound land use planning." These goals and objectives call for a balanced approach between preserving agricultural land and promoting economic growth.

Furthermore, and as provided on page 3.3-13 of the Draft EIR, with mitigation measures proposed in other resource sections (e.g. air quality, noise, etc.) project-related activities would not adversely affect adjacent agricultural operations. Additionally, the project would not develop infrastructure that would attract or encourage new development of adjacent farmlands. Further, the provisions of the Imperial County Right-to-Farm Ordinance (No. 1031) and the State nuisance law (California Code Sub-Section 3482) would continue to be enforced. Based on these considerations, the project is not expected to adversely impact adjacent landowners' abilities to economically and conveniently farm adjacent agricultural land and the impact is considered less than significant.

The comment states that the project would terminate and prevent agricultural uses on the project site for the project's operational life for at least 30 years. This project-related impact is disclosed in Impact 3.3.1 of the Draft EIR which states that. "..., the project would result in the temporary conversion of approximately 227 acres of land currently under or available for agricultural production to non-agricultural uses." This impact was determined to be significant prior to implementation of proposed mitigation measures. With the implementation of Mitigation Measures AG-1a and AG-1b, this impact would be reduced to a less than significant level. Mitigation Measure AG-1a addresses the temporary conversion of agricultural lands by providing the applicant an option to provide agricultural conservation easement(s), payment of an agricultural in-lieu mitigation fee which would be placed in a trust account administered by the Imperial County Agricultural Commissioner's office and used for such purposes as "acquisition, stewardship, preservation and enhancement of agricultural lands" or public benefit agreement, which requires an Agricultural Benefit Fee payment that would be used for "addressing the mitigation of agricultural job loss on the local economy, or emphasis on creation of jobs in the agricultural sector of the local economy for the purpose of off-setting jobs displaced by the project. Mitigation Measure AG-1b addresses the restoration of the agricultural lands. These measures have been developed and approved by the Board of Supervisors as adequate mitigation to address the temporary conversion of agricultural lands for solar energy use within the County.

D.6 Pursuant to CEQA, an economic impact is not an impact on the physical environment that must be addressed in an EIR (see CEQA Guidelines Section 15131). The County considers the fiscal and economic impacts as part of approval of the projects. Conditions of Approval, in terms of financing of services, etc. are also placed on each of these projects based on the findings of the particular fiscal/economic study. Previous solar projects approved by the County have been shown to provide a fiscal benefit to the County.

Economic, employment, and fiscal factors will be considered as part of the Planning Commission and the Board of Supervisors consideration for approval of the projects. Like other previously-approved solar projects in the County, it is anticipated that the proposed project would have an overall economic, employment and fiscal benefit as compared to the existing agricultural use of the project sites; however the final determination will be made as part of the Planning Commission and Board of Supervisors hearings on the project.

D.7 Please refer to responses to comments D.4 and D.5.

- **D.8** Please refer to response to comment D.2 related to the project's consistency with the Renewable Energy and Transmission Element.
- D.9 The EIR analyzes the environmental effects on the 30-year CUP followed by post-project restoration of the project site. The application of another CUP would be subject to additional CEQA review at the time an application is filed with the County. Any consideration of potential impacts to important farmlands would be based on future project details, which remain remote and speculative at this time.
- D.10 The project's cumulative effects to agricultural resources, including important farmlands, are addressed on pages 5-7 through 5-8 of the Draft EIR. As provided, the incremental impact of the loss of 227 acres of farmland would be mitigated via full restoration of the project site to comparable agricultural production post-project, purchase of an agricultural easement at a 2:1 ratio, or payment into the County's agricultural mitigation fund, which the County uses at its discretion to mitigate for farmland loss consistent with its General Plan policies. The comment's statement regarding impacts to agriculture-serving business is unsupported by substantial evidence and beyond the scope of CEQA.

The Prime Farmland (4.4 acres), Farmland of Statewide Importance (205 acres), and Unique Farmland (1 acre) within the project site comprises a 0.04 percent of the total Important Farmland (2018 reporting year) (522,375 acres) in the County. Thus, the proposed project would temporarily convert a very small fraction of the total Important Farmlands in the County and have a minimal effect on agricultural land on a cumulative scale. Furthermore, the conversion would be temporary and last for the duration of the project's useful life which is expected to be up to 30 years. Mitigation Measure AG-1a (Payment of Agricultural and Other Benefit Fees), AG-1b (Site Reclamation Plan), and AG-2 (Pest Management Plan) would be implemented to reduce potential impacts on agricultural resources to a level less than significant.

- D.11 Impact 3.5-1 (page 3.5-20) of the EIR provides an analysis of the project's potential to result in electrocution of avian species. Mitigation Measure BIO-1 will require all electrical components on the project site to be either undergrounded or protected so that there will be no exposure to wildlife and therefore no potential for electrocution. Additionally, based on the Avian Powerline Interaction Committee's (APLIC) 1996 report on power line electrocution in the U.S., avian electrocution risk is highest along distribution lines (generally less than 69 kV) where the distance between energized phases, ground wires, transformers, and other components of an electrical distribution system are less than the length or skin-to-skin contact distance of birds. The distance between energized components along transmission lines (>69 kV) is generally insufficient to present avian electrocution risk.
- **D.12** Impact 3.5-1 (pages 3.5-19 through 3.5-20) of the EIR addresses the project's potential to result in indirect impacts to loss of nesting and foraging habitat.
- D.13 Chapter 3.12, Public Services, addresses the proposed project's increased need for fire protection services and project design features proposed to reduce the risk of fire. The County and project applicant have been in coordination with the County of Imperial Fire Department with regards to the required fire protection systems that must be included in the project for safety, including specific requirements for the battery energy storage system (BESS). The project applicant and the Fire Department had a meeting on April 27, 2021 to discuss the project components, site access, and fire suppression features of the project. The Fire Department had concerns of the original location of the BESS at the southwest corner of the

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project site. Specifically, fire trucks would need to drive across the train tracks to access the BESS. The Fire Department requested that the location of the BESS be relocated from the southwestern corner of the project site to the south-central portion of the project site, just east of the railroad tracks, to minimize safety risk of crossing the railroad tracks. The Site Plan shown in Figure 2-3 of the Draft EIR reflects the Fire Department's request. Additionally, the original site plan was revised by the applicant in response to Fire Department input to relocate the substation to the south-central portion of the project site. The project design identifies the fiberoptic cable originating from the project substation or microwave tower to be within the substation footprint. Therefore, these components would also be located at the south-central portion of the project site. Furthermore, utility-scale solar facilities have been operating in the County for over 10 years with no incidence of fire or significant fire risk.

D.14 CEQA does not require that the EIR analyze the greenhouse gasses emitted to produce the components used to build PV panels that may be utilized for the project or from the breakdown/recycling/disposal of project components. Pursuant to CEQA Guideline 15277, "Any emissions or discharges that would have a significant effect on the environment in the State of California are subject to CEQA where a California public agency has authority over the emissions or discharges."

The specific manufacturer of the solar PV panels that would be installed on the project site has not been identified; however, they would likely be derived from an imported source. Should panels be obtained from a factory within California, the environmental impacts associated with the manufacturing of those panels (included GHG emissions) would have been analyzed and considered pursuant to CEQA as part of any discretionary approvals or applicable air district permits associated with construction and operation of that particular manufacturing facility.

The comment asserts that the EIR provides no evidence showing what kind of electricity generation the project would replace. As described on page 3.8-12 of the EIR, the proposed project would reduce GHG emissions in a manner consistent with SB 32 and other California GHG-reducing legislation by creating a new source of solar power to replace the current use of fossil-fuel power and reduce GHG emissions power generation and use.

D.15 The comment asserts that the Draft EIR did not analyze impacts related to the potential health risks associated with electromagnetic fields (EMF).

The California Department of Health Services (DHS), California Electric and Magnetic Fields Program, provides information regarding known possible health effects from EMFs created by the use of electricity. DHS references the National EMF Research and Public Information Dissemination (RAPID) Program, established by Congress as part of the Energy Policy Act of 1992, which has published its findings concluding evidence of the risk of cancer from EMF around power lines is weak. The report recognizes that EMF exposure "cannot be recognized as entirely safe" but "believes that the probability that EMF exposure is truly a health hazard is currently small" with "marginal scientific support that exposure to this agent is causing any degree of harm." Furthermore, in a decision from the California Public Utilities Commission (CPUC), the CPUC stated "at this time we are unable to determine whether there is a significant scientifically verifiable relationship between EMF exposure and negative health consequences." (CPUC Decision D.06- 0I-042.)

The comment cites to studies linking EMF exposure to increased health risks to humans and other mammals. The County is entitled to rely on the studies cited above, particularly where they have been prepared by the regulatory agency with jurisdiction over the relevant subject

matter. Under established CEQA precedent, lead agencies may accept the determinations and conclusions reached by one set of experts, even though other conclusions may be reached by other experts. (Environmental Council of Sacramento v. City of Sacramento (2006) 142 Cal. App. 4th 1018, 1042; Eureka Citizens v. City of Eureka (2007) 147 Cal. App. 4th 357, 371-372; Greenbaum v. City of Los Angeles (1984) 153 Cal. App. 3d 391, 412.)

Pursuant to CEQA Guidelines Section 15145 "If, after a thorough investigation, a lead agency finds that a particular impact is too speculative for evaluation, the lead agency should note its conclusion and terminate discussion of the impact." The available evidence as evaluated by the CPUC and other regulatory agencies has not established that EMF fields pose a significant health risk, further evaluation of this issue in the EIR would be speculative and is not warranted or required.

D.16 The County has evaluated all the potential impacts of the proposed project in accordance with the provisions of CEQA and recirculation of the EIR is not necessary pursuant to CEQA Guidelines Section 15162.

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DEIR COMMENTS ~ ORNI 30,LLC (BRAWLEY SOLAR)

GPA#21-0003; ZONE CHANGE #21-0003; CUP#20-0030, WSA & INITIAL STUDY #20-0041

DATE: 2-10-2022

TO: David Black, Planner IV via: davidblack@co.imperial.ca.us; Planning & Development Services Dept, County of Imperial: cc: svolker@volkerlaw.com; jvolker@volkerlaw.com; jvolker@volkerlaw.com; jvolker@volkerlaw.com; jvolker@volkerlaw.com; jvolker@volkerlaw.com; jvolker@volkerlaw.com; jvolkerlaw.com; <a href="

FROM: Donna (Cox) Tisdale, Michael Cox, Carolyn (Cox) Allen, Lawrence Cox; C/O Donbee Farms, PO Box 301, Brawley, CA 92227; & on behalf of Backcountry Against Dumps, a 501 c 4 public benefit non-profit: PO Box 1275, Boulevard, CA 91905: 619-766-4170; tisdale.donna@gmail.com

RE: Comments on DEIR for Brawley Solar Energy Facility Project SCH No. 2021070424¹

These opposition comments are submitted with the permission of those named above. Our previous NOP comments are incorporated in full by reference. We strongly object to any approvals of the General Plan Amendment, Zone Change, Approval of Conditional Use Permit, and / or Certification of the Draft EIR (DEIR). The DEIR is inadequate and should be rejected, corrected, and re-circulated.

SOLAR PANELS ALREADY PURCHASED?

On Thursday, December 23, 2021, Lawrence Cox took the two photos below of what he estimated to be more than 100 pallets of solar panels stored in the yard at Ormat's Brawley North geothermal plant at the corner of Hovely Road and Andre Road, just west of their proposed Brawley Solar site.



Draft-EIR.pdf&clen=15426116&chunk=true

E.1

E.2

County of Imperial

Brawley Solar DEIR comments - Cox Family, DonBee Farms & Backcountry Against Dumps 2-10-22

The photos document the fact that the boxes are labeled Canadian Solar PV Module CS3w. The public notice says the Project will use bifacial PV modules. Here is a link to a Canadian Solar bifacial module CS3w. It says there are 27 pieces per pallet². Wister Solar³ is the only other Ormat related solar project identified on the ICPDS website (icpds.com), Wister Solar is reportedly under construction three miles north of Niland after being approved by the Board of Supervisors on 1-26-21. It is unlikely that any PV panels for Wister Solar would be stored in Brawley.

E.2 cont'd

Therefore, one could surmise that the Brawley Solar Project approval may have been predetermined. Or Ormat is so confident they will be approved that they have already purchased and stored Project PV panels at their Brawley North geothermal facility. Is solar panel storage permitted at Brawley North site?

PROJECT APPLICANT ORNI 30 LLC:

ORNI 30 LLC'S s Statement of Information (SOI) posted on the Secretary of State's (SOS) Office website states the LLC's type of development is geothermal, not solar.

- The LLC was formed in 2008 and registered with the SOS in 2009. The SOS website shows one document filed in 2009 (#200927810309), there is an 11 year gap with no documents posted, and then they filed SOIs in 2020 and 20214.
- Both SOIs filed in 2020 (#20-F22289) and 2021 (#21-F91083) claim the LLC's business is GEOTHERMAL. This is false / erroneous information that demonstrates ORNI 30 LLC does not pay attention to details which does not bode well for Project neighbors like the Cox family farming business and employees who live immediately next door.

PROJECT DESCRIPTION

The NOP and DEIR Project Description both claim the use of fiberoptic line OR microwave tower. Elsewhere in the document that description is changed to fiberoptic line AND microwave tower. Clarification / correction is needed.

E.3

- To reduce potential risks/ harm to Cox farm employees housed next door, and other adjacent homes and residents, we strongly request that the following:
 - Use fiberoptic line instead of microwave tower like Ormat did for Wister Solar.
 - Move the project substation, the Battery Energy Storage System, and any microwave tower, from the SE corner of the project to the SW corner of the project to increase the setback and safety zone from the sensitive receptors next door. This change would also reduce the length and potential cost of the gen-tie line

RENEWABLE ENERGY OVERLAY ZONE

E.6

E.5

 $extension://efaid nbmn nnibpcajpcglcle find mkaj/viewer.html?pdfurl=https%3A%2F% \underline{2Fbusinesssearch.sos.ca.gov}\%2FD ocument \%2FRetrieve PDF$

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 $^{^2 \} chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https://dx.2F% {2Fwww.canadiansolar.com} \% 2Fwp-1000 - 10$ content%2Fuploads%2F2019%2F12%2FCanadian_Solar-Datasheet-HiKu_CS3W-P_EN.pdf&clen=1575330&chunk=true

https://www.icpds.com/planning/environmental-impact-reports/orni-30-cup20-0030-draft-eir

- We strongly object to the amendment of the Renewable Energy (RE) Overlay Zone to include the proposed Project.
- As stated, the RE Overlay Zone is concentrated in areas that were determined to be the most suitable for the development of renewable energy facilities while minimizing the impact on other established uses.
- According to the ICPDS Renewable Energy Overlay Zone and Project Map⁵, there are already 22 operational solar projects; six solar projects approved and under construction; 12 solar projects approved and not built; and eight solar projects pending entitlement
- However, that map is not current. It does not include ORNI 30 LLS's Brawley Solar. And it does not include January 2021 Board of Supervisors approval of Ormat's Wister Solar . Are there more?

PROJECT IMPACTS & PROPOSED MITIGATION MEASURES

- Mitigation measures are only good if they are actually enforced. Project contact information must be posted at the Project and be clearly visible from the public right of way.
- Mitigation Measure Ag-1a does not and cannot reduce impacts to less than significant, as claimed. Proposed conservation easements placed on other ag land, in lieu payments, or community benefits for the loss of ag land does not mitigate the amount of ag land lost or replace the viable ag land that is lost. There is a net loss overall.
- Statewide, ag land is being converted to non-ag use at an alarming pace, averaging almost 50,000 acres annually between 1984-2014, that is simply not sustainable if we want to maintain national food and fiber security overall. Imperial Valley farmland should be protected!
- Site Reclamation Plan AG-1b must be mandatory and include estimated inflation costs for full return of site to active farming with soil of equal or better quality and depth, than the existing soil. Any excess top soil, after leveling for Project, should be stored on-site for future return to farming in the event that ever actually occurs, which is highly doubtful.

ENVIRONMENTAL TOPICS ADDRESSED

- 1.4.3: We CAN support the stated Areas of Controversy, below, with the addition of NOISE, WASTE, and Electromagnetic Exposure Safety:
 - o "... conversion of farmland to non-agricultural uses, damage to crops, wildlife, water supply, fire hazards associated with the battery energy storage system, health effects from air pollution, noise and hazardous materials, and change of visual character."
- Noise and waste /recycling for PV panels and lithium ion batteries should not have been eliminated from Further Review in Notice of Preparation.
- Project noise from Solar PV tracking, inverters, transformers, 40 MW (approximately 40 cargo containers) of batteries, AC units, the new Project substation/switchyard, and all related equipment will basically be full time, while noise from existing farming operations is intermittent.

https://icpds.maps.arcgis.com/apps/webappviewer/index.html?id=0d869c18d11645cc918391fdcac24b80

E.6 cont'd

E.7

E.8

E.9

E.10

⁵ As of 1-26-21:

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- Failure to include waste handling is inexplicable and can potentially and unethically place the
 future costly burden on Imperial Valley taxpayers in a predominantly low-income area.
- All project PV panels and related project equipment will eventually need to be replaced /
 upgraded. Cumulative impacts from the need to recycle or dispose of all those components
 from the proposed Project, in addition to the over 25,000 of acres of solar panels already
 approved and/or operating in Imperial County, will be incredibly expensive and may result in the
 need to permit and pay for costly new facilities, potentially at expense of County tax payers.
- We refer you back to the concerns regarding Electromagnetic Exposure / Safety that were raised in our Brawley Solar NOP comments (pages 7-10), under Inverters, Transformers & Associated Equipment in the Energy section, submitted on 8-30-21.

AGRICULTURAL RESOURCES

Imperial County has already sacrificed over 25,945 acres productive farmland in the name of so-called renewable energy. See ICPDS Energy Project List – Alternative Power Projects 2021⁶:

- Figure 3.3-1. Important Farmlands:
 - Documents the fact that the majority of the Project site is designated Farmland of Local Importance, with some Prime Farmland in the southern portion.
- Table 3.3-1. Imperial County Change in Agricultural Land Use Summary (2016 to 2018): This
 outdated table document the loss of 6,097 total Imperial County acres from 2016-2018.
 However, that number is deceptively low due to the previous /total loss of farmland that should
 be included in the EIR.
- The Department of Conservation reports the conversion / loss of 20,340 acres of farmland in Imperial County in the 8 year period between 2010 and 2018. Numbers for 2018-2021 are reportedly not yet available.
 - According to California Department of Conservation (DOC), the Imperial County 2010-2012 Land Use Conversion Table A-9 Part III, the total conversion was 5,393 acres.
 - The DOC's the 2012-2014 Imperial County Land Use Conversion report (Table C-1) recorded a total loss of 6,800 acres of agriculture land to non-farm use⁷.
 - In DOC's 2014-2016 Farmland Conversion Report (Table A-9), Imperial County recorded a total loss of 2,050 acres to non-ag use⁸.
 - How much more farmland has been lost between 2018 and 2021? Unfortunately, the DOC reports that information is not yet available.
 - The available figures between 2010 and 2018 record an average annual loss of 2,543 acres in Imperial County.
 - The annual statewide average loss was 49,829 acres, according to the DOC's Farmland Mapping and Monitoring Program, NET important Farmland Conversion from 1984-2014. That annual rate of loss has likely increased exponentially since 2014 due to conversion to renewable energy.

E.10 cont'd

E.11

https://docs.google.com/spreadsheets/d/1zQqJ8b1AyB54WjyWQpwY94j7x6CMsL88/edit#gid=1288587879

⁷ https://www.conservation.ca.gov/dlrp/fmmp/Pages/2012-2014 Farmland Conversion Report.aspx ⁸ https://www.conservation.ca.gov/dlrp/fmmp/Pages/2014-2016 Farmland Conversion Report.aspx

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- Despite the claims to the contrary, the loss / conversion of productive farmland is significant and cumulatively considerable.
- The proposed mitigation measures do not and cannot replace the amount of farmland that has already been lost and is proposed to be converted with Brawley Solar and others.
- The total conversion / loss of farmland acreage must be disclosed in the EIR to better understand the incremental losses that add up to significant and cumulatively significant losses / impacts in Imperial County and the State in general.

The importance of open space in California is also recognized in the state Constitution (Art. XIII, Section 8), state statutes (Civil Code section 815; Government Code sections, 51071, 51220, and 65561°

- ARTICLE 1. Declaration [51070 51073] (Article 1 added by Stats. 1974, Ch. 1003.)51071. The Legislature finds that the rapid growth and spread of urban development is encroaching upon, or eliminating open-space lands which are necessary not only for the maintenance of the economy of the state, but also for the assurance of the continued availability of land for the production of food and fiber, for the enjoyment of scenic beauty, for recreation and for the use and conservation of natural resources. (Added by Stats. 1974, Ch. 1003.)
- ARTICLE 2. Declaration [51220 51223] (Article 2 added by Stats. 1965, Ch. 1443.)51220. (excerpts) The Legislature finds:(a) That the preservation of a maximum amount of the limited supply of agricultural land is necessary to the conservation of the state's economic resources, and is necessary not only to the maintenance of the agricultural economy of the state, but also for the assurance of adequate, healthful and nutritious food for future residents of this state and nation...(d) That in a rapidly urbanizing society agricultural lands have a definite public value as open space, and the preservation in agricultural production of such lands, the use of which may be limited under the provisions of this chapter, constitutes an important physical, social, esthetic and economic asset to existing or pending urban or metropolitan developments...f) For these reasons, this chapter is necessary for the promotion of the general welfare and the protection of the public interest in agricultural land. (Amended by Stats. 1980, Ch. 1219.)
- 65560 excerpt: "Open space used for the managed production of resources, including, but not limited to, forest lands, rangeland, agricultural lands, and areas of economic importance for the production of food or fiber; areas required for recharge of groundwater basins; bays, estuaries, marshes, rivers, and streams that are important for the management of commercial fisheries; and areas containing major mineral deposits, including those in short supply.
- 65561 excerpt: The Legislature finds and declares as follows:(a) That the preservation of open-space land, as defined in this article, is necessary not only for the maintenance of the economy of the state, but also for the assurance of the continued availability of land for the production of food and fiber, for the enjoyment of scenic beauty, for recreation

E.11 cont'd

E.12

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⁹https://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=GOV&division=1.&title=7.&part=&cha pter=3.&article=10.5

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and for the use of natural resources.(b) That discouraging premature and unnecessary conversion of open-space land to urban uses is a matter of public interest and will be of benefit to urban dwellers because it will discourage noncontiguous development patterns which unnecessarily increase the costs of community services to community residents.

E.12 cont'd

PROJECT IS NOT HONESTLY CONSISTENT WITH APPLICABLE GENERAL PLAN AGRICULTURE POLICIES

- Goal 1: Claiming that the conversion of productive agland for a period of 25 years to an
 indefinite date is TEMPORARY in nature, and therefore consistent with the General Plan, is
 weasel wording and incredibly disingenuous.
- Goal 2: Denial that the industrial solar Project represents leapfrogging of non-ag land use is a
 stretch. The closest large solar project is located miles away. In addition, Both the Brawley
 Waste Water Treatment facility and the railroad support the community at large. There is no
 promise or guarantee that the ORNI 30 LLC Brawley Solar project's conversion of productive
 farmland will provide any energy or long-term benefits to Imperial County residents as the other
 two named projects do.
- Objective 2.2: The project will result in the need for emergency services for fire and medical and haz mat responses due to injuries, fires, and potential cascading thermal runaway meltdowns of the BESS.
- Objective 2.3: See response to Goal 1 above.
- Objective 2.6: When you have to make changes for a project to be consistent, which means it is
 NOT consistent. The Project site is not designated for the proposed use nor is it a public facility,
 it is a private for-profit development designed to benefit from lucrative tax payer funded
 incentives and tax credits.
- Goal 3: See response to Objective 2.6 above.
- Objective 3.2: The current lithium ion batteries are very unstable if they get too hot or the cells
 are compromised. If they ignite, they are almost impossible to extinguish as the fire can be
 completely inside the battery casing. The potential for fires involving solar panels and / or the
 BESS batteries, and related toxic clouds of emissions drifting over the Cox family's and other
 adjacent productive farmland and adjacent occupied housing will NOT BE CONSISTENT and
 renders Rule 407 prohibitions of such dangerous and harmful discharges useless during an
 emergency event.
- Objective 3.3: Based on the alleged lack of maintenance some of Ormat's geothermal
 infrastructure, there are valid concerns that the Brawley Solar site will be similarly neglected
 with lack of site management and control.

SITE PLAN; PREPARATION; CLEAN UP & RESTORATION

- We strongly request that the project substation and Battery Energy Storage System be moved
 from the SE corner of the project to the SW corner of the project to increase the setback and
 safety zone from Cox farm employee housing and the other adjacent homes. This change would
 also reduce the length and potential cost of the gen-tie line.
 - Section 2.4.2 conflicts with Section 2.4.1 (emphasis added): "Material and equipment staging areas would be established <u>on-site</u> within an approximate 4-acre area. The
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E.13

E.14

E.15

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E.22

staging area would include an air-conditioned temporary construction office, a first- aid station and other temporary facilities including, but not limited to, sanitary facilities, worker parking, truck loading and unloading, and a designated area for assembling the support structures for the placement of PV modules."		E.15 cont'd
 Any excess top soil after grading to make site level for the Project should be stockpiled for use when project is decommissioned to meet requirement that the site be returned agriculture use. Allegations were made that other developers hauled tons of good top soil off-site, during grading, from at least one previously constructed commercial solar project located in the southwestern section of Imperial Valley farmland. 		E.16
 Section 2.4.2 only mentions "disposal" and 'dumpsters' with no mention of recycling materials or on-site recycling bins which conflicts with Table ES-1 mitigation. 		E.17
 New California law requires treating PV modules as universal waste while admitting some components may still be considered hazardous waste. 	j	E.18
Recycling should not be postponed to the decommissioning stage of the project.		E.19
 Prior to decommissioning, there may be a recall of or damage to PV panels, batteries and other project components and materials that can and should be recycled or properly disposed of. 	j	E.20
PHOTOVOLTAIC PANELS; SOLAR ARRAYS; DECOMISSIONING & RECYCLING		
According to the Canadian_Solar-Datasheet-HiKu_CS3W-MS_EN, maximum operating efficiency is only 19.5% to 20.6%, depending on which CS3W module is used (430MS-455MS) ¹⁰ . That estimate is better than some but less than others.		E.21
 According to a Department of Toxic Substance Control (DTSC) Press Release (10-26-20), 		

- California is the First in the Nation to Add Solar Panels to Universal Waste Program 11
 - "SACRAMENTO On Jan. 1, California will be the first state in the nation to add hazardous waste solar panels to its universal waste program, a move intended to promote solar panel recycling and reuse and to keep them out of landfills. The new regulation is a stepping stone toward the full "cradle-to-grave" approach for climate initiatives that California sets forth and acts as a model for the rest of the nation to follow.

With solar providing an increasing amount of the state's electricity, and new laws that require solar panels on new homes, California is one of the first states to streamline waste management options for these energy systems.

"Once again, California is leading the way on the safe handling of hazardous waste," said Dr. Meredith Williams, Director of the Department of Toxic Substances Control. "This streamlined and easy to understand end-of-life system is another great step forward in our state's efforts to put environmental protection first - both for the health and safety of our people and natural resources."

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¹¹ https://dtsc.ca.gov/2020/10/26/news-release-t-17-20/

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The new regulation on solar panels, also known as photovoltaic modules, provides a less restrictive and more streamlined alternative to waste management for solar panels, while still maintaining restrictions on toxic chemicals such as lead, cadmium and selenium.

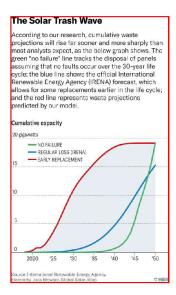
The regulation applies to the handling, collection, accumulation, and transportation of solar panel waste. It allows self-authorization for universal waste handlers to conduct certain physical treatment activities on solar panels.

Solar panels or parts that are not recycled and are slated for disposal may still be considered hazardous waste and subject to hazardous waste standards.

The universal waste designation only applies to solar panel waste handled in California. Once transported outside California, the waste must be managed in compliance with respective local, state, and federal regulations related to hazardous wastes.

The new regulation is posted on DTSC's website at: https://dtsc.ca.gov/dtsc-final-regulations/"

- The DTSC website also includes the List of Universal Waste Handlers that accept PV Modules
 (Solar Panels). The closest facilities are located in Riverside, San Bernardino, and San Diego¹².
 None are listed in Imperial Valley. That means all that waste will potentially need to be hauled long distance for handling.
- Sustainable Business Practices | The Dark Side of Solar Power: Harvard Business Review graphic below, included in our NOP comments, is self explanatory¹³



https://dtsc.ca.gov/photovoltaic-modules-pv-modules-universal-waste-management-regulations_uw-handlers/# https://hbr.org/2021/06/the-dark-side-of-solar-power

E.22 cont'd

E.23

E.24

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E.25 Have the GHG emissions related to waste hauling been counted and analyzed for this project? The county should require the project developers / owners to post a bond to cover the full cost of decommissioning discarded solar panels, BESS batteries, and other electronic components E.26 during operation, any upgrade of technology, and project decommission, with the anticipation that certain solar panels and other components currently need to go to a Class 1 waste facility due to toxic compounds. **BATTERY ENERGY STORAGE SYSTEM (BESS) & PROJECT EMISSIONS** E.27 A 54,000 square foot BESS facility is huge. See comments on Objective 3.2 above. E.28 The DEIR does recognize sensitive receptors living next to the project site but limits impacts analysis of Toxic Air Contaminants (TAC) to the limited use of diesel generators. E.29 It fails to address the potential for TAC generated by off-gassing from project components and potential BESS fires including potential for thermal runaways with lots of toxic smoke that can impact sensitive receptors including Cox family farm employees and other residents. We repeat and incorporate in full by reference our BESS concerns documented in our NOP comments, including high fire risk and potential for thermal runaway meltdowns with toxic air and ground pollution resulting from melting battery chemicals and components. The chemicals that are released during thermal runaway can be toxic and can cause electrical fires, including battery explosions. Toxic fumes will move off-site to neighboring homes and farming operations. Related toxic E.30 residues from those emissions can potentially impact the quality and safety of any crops growing within the path of those toxic emissions, similar to adverse overspray impacts. Lithium-ion batteries have a dual chemical and electrical hazard, including the chemical hazards listed in the table below.14 Asphixyant Carbon Dioxide (CO₂) ~30 ~30 Flammable ~20-25 Flammable, Toxic Flammable 3-8 Flammable 1-3 Flammable 1-3 Flammable <1 Flammable 0.3 Corrosive, Toxic These concerns support our request for the BESS to be moved to the south western corner of the Project to increase the safety setback from our farm employee housing and the families E.31 that live across the road from the southeastern corner of the Project where the BESS is currently proposed. Having proper fire suppression and firefighting equipment on-site for potentially hazardous E.32 chemical fires are critical. Additionally, battery recycling / disposal will be an issue throughout the project and not just E.33 during decommissioning or retrofitting.

¹⁴ https://li-cycle.com/news/lithium-ion-battery-thermal-runaway-whats-the-risk/

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- What is the potential for off-gassing from new electrical and battery components of the Project and have they been analyzed?
- Below is a summary of the electromagnetic radiation issues associated with residential solar electricity systems from the Building Biology, The Science of Healthy Buildings¹⁵:
 - Photovoltaic systems can have detrimental health effects due to the following issues:
 - Electrical Noise: The Inverter injects electrical "noise" called Dirty Electricity into house
 electrical circuits and devices that can be irritating to sensitive people; even people who
 have not been conscious of sensitivity in the past could experience discomfort. People
 have reported symptoms of nausea, headaches, and fatigue.
 - 2. High Magnetic Fields: PV systems as well as other alternative systems can be because unwanted, current flow on your house grounding system as well as neighboring houses. This can cause high magnetic fields in the living space depending on electrical system specifics. This current flow carries pulses made by the inverter that produce symptoms in some people.
 - 3. Radio Frequency Radiation: Wireless (through the air) communication is frequently part of an additional system for billing and equipment monitoring. This is EMR in the microwave or radio frequency range of the electromagnetic spectrum. It's termed Radio Frequency (RF) radiation. The American Academy of Environmental Medicine, released a letter in January 2012 to the Public Utilities Commission of California speaking to this radiation. The most important passage is: "Chronic exposure to wireless radio frequency radiation is a preventable environmental hazard that is sufficiently well documented to warrant immediate preventative public health action."
- Symptoms from EMR exposure can include but aren't limited to nausea, headaches, fatigue
 and sleep disturbance, irritability, skin problems, dizziness, visual, mental confusion and
 hearing disruptions like tinnitus.
- The impacts noted above can be expanded exponentially for homes adjacent to large solar arrays like the Brawley Solar project, including the grounding of the project that can move dirty electricity off-site and into homes. Dirty electricity increases dramatically when the project is still producing energy but not allowed to send that energy to the grid due to forced or voluntary project curtailment. Instead all that energy is dumped into the ground and moves off-site!
- There is little to no research on adverse impacts from large solar arrays due largely to the fact
 that the federal and state governments promote solar energy in the name of climate change, so
 they limit or deny research funding / grants for any studies on adverse impacts. And they fund
 supportive studies. It is called Science for Sale¹⁶ where rented white coats support industry or /
 or government positions often to the detriment of public health and safety.

E.34

E.35

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¹⁵ https://buildingbiologyinstitute.org/free-fact-sheets/photovoltaic-solar-panels/

¹⁶ https://publicintegrity.org/environment/about-science-for-sale/

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	SUBSTATION	٦	
•	See previous comments/requests. Substation and BESS should be moved to southwestern corner of project from southeastern corner to increase safety setback from our occupied farm employee housing and other neighbors.		E.36
	GEN-TIE LINE		
•	The length and cost of the gen-tie line can be reduced by granting our request to move the substation and BESS to the southeastern portion of the Project site, away from sensitive receptors.		E.37
	FIBEROPTIC CABLE INSTEAD OF MICROWAVE TOWER	_	
•	We prefer use of the fiberoptic cable over the Microwave tower. There are health concerns related to radiation impacts from Microwave towers.		E.38
٠	Ormat's Wister Solar FEIS reports the use of several miles fiber optic lines. Why would Brawley Solar be any different?		E.39
•	On February 2, 2022, the Pittsfield, Massachusetts Board of Health <u>unanimously voted</u> to issue a cease and desist order to Verizon to shut down its tower located at 877 South Street. Families living in the neighborhood near the tower reported wireless radiation-related health issues soon after the tower became operational in 2020 and since then, have been working tirelessly to turn the transmissions off ¹⁷ .		E.40
•	If the County does allow the use of a microwave tower, it would be much safer for the Cox farm employees and other neighbors to have that tower relocated to the southeastern potion of the project with the substation and BESS.		E.41
	SECURITY		
•	A motion detection and security camera system is mentioned. Will security lights be triggered by wildlife movement such as rabbits? If so, that could represent a major nuisance for adjacent Project neighbors.		E.42
	FIRE PROTECTION / FIRE SUPPRESSION		
•	The best laid plans are often insufficient to get the job done right. See our comments / concerns on BESS above. We reiterate our request to relocate the substation and lithium ion BESS to the southwestern portion of the project to better protect Project neighbors.		E.43
	PROJECT CONSTRUCTIONL; PERSONNEL; EQUIPMENT & SCHEDLUE	ĺ	
•	One location or the other should be confirmed as location for project laydown and construction staff parking. Is it on-site or at North Brawley Geothermal?		E.44

 $^{^{17} \, \}underline{\text{https://www.iberkshires.com/story/67151/Pittsfield-Health-Board-Ordering-Verizon-to-Remove-Cell-} \underline{\text{Tower.html}}$

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		_	
•	One section includes Crew Trucks but does not confirm if construction parking will be onsite or at North Brawley Geothermal property.	١	E.45
•	Is staff parking for a separate solar project included in the Ormat's North Brawley permit?	J	
•	DEIR contains the following out of date and or / conflicting information under 2.4.2:	í	
	 "Construction is anticipated to start in quarter four of 2021 and would take 		E.46
	approximately 6-9 months to complete"		
	What is the current schedule?		
	WATER USE	_	
	The use of recycled water for construction and operation should be required as part of any		
	permit. There is no need to waste raw Colorado River water for construction and operation of		
	a non-ag project.		
_			E.47
	The City of Brawley Wastewater Treatment plant is immediately next door to the west.		
•	6.3 Mineral Resources: This section mentions idle water well. It should have been analyzed for		
	production rate and use for the Project. Construction water could potentially be sourced from		
	this onsite well.	J	
	OPERATIONS & MAINTENANCE		
	C	٦	
•	Conversion from active farmland with related year-round employment and business services to		E.48
	remote monitoring with NO on-site employees is just one reason the project should not be		⊣0
	allowed to be rezoned to be included in the Renewable Energy Zone.	J	
•	Solar projects create a heat sink effect, especially during the hot dry early summer months.		
	Temperatures in the solar project area can be significantly higher than neighboring fields and		E.49
	the heat moving off the solar project area can adversely affect the quality of crops such as		
	alfalfa, alfalfa seed, melons, corn, and lettuce.	J	
•	Other concerns include weed seeds moving off of the solar site into adjacent ag fields, and the)	
	potential for a rodent population such as gophers ground squirrels, mice or rats moving off-site		E.50
	into fields that that cause damage, especially to produce crops.	J	
		٦	
	REGIONAL EXISTING CONDITIONS		
•	The DEIR fails to mention the 38,000 acres of productive Imperial Valley farmland (25,945) and		E.51
	desert lands (13,000) that have already been converted to industrial solar and wind turbines.		
	VISUAL CHARACTER; KEY OBSERVATION POINTS & SCENIC VISTAS)	
•	KOP 2 shows the view from the actual intersection of Best and Ward Road which does not		
	represent the view of the project from the Cox family farm employee houses located there.		
	Currently, those properties have an open view of growing crops.		E.52
_	That view will be converted and downgraded to a sea of buzzing industrial solar panels, huge		
•			
See	battery containers, a new substation, a new gen-tie line, and a new microwave tower.		
•	A photo simulation can never fully convey all aspects of loss when farmland is converted to		
	industrial solar. The new industrial buzzing soundscape is a big part of that conversion.	J	
	Brawley Solar DEID comments Cov Family DonBoo Farms & Backcountry Against Dumps 2		

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٠	KOP 2 photo shows the Project site immediately west of the Cox family farm housing as vacant. Are there any restrictions for future Project expansion into that are that is currently proposed as vacant?		E.53
	Figure 3.2-2. Fails to identify KOP 2. It only lists KOP 1 for both photos.)	E.54
	Figure 3.2-4. Fails to identify KOP 4. It only lists KOP 3 for both photos.	ń	E.55
	Figure 3.2-8. Proposed Key Observation Point 3 & Figure 3.2-9. Proposed Key Observation	7	L.33
35	Point 4		
	 The Project simulations are missing from these two figures. Instead, they show the current views which are preferable 	J	E.56
•	While there are no designated scenic vistas in the area, the calming vista of growing crops and)	
	the wildlife that use them for forage and rest are vastly superior to industrial solar arrays,		
	microwave towers, related BESS and other equipment.		
•	Agricultural landscape is an integral part of our social and environmental psyche as a		
	people, a culture, and a way of life. The open space assets of ag land are widely recognized as		
	valuable.		E.57
•	Project views from neighboring properties are disregarded as insignificant because they will still		
	be able to see distant views of the Chocolate Mountains OVER the current open space views of		
	green and growing crops that will be replaced by dead landscape of the proposed industrial		
	solar complex and all that goes with it.		
•	The loss of the visual aesthetic of several hundred acres of growing crops and the wildlife that		
	use them is not minor for neighbors, the most impacted members of the public.		
•	The Project is NOT consistent with the following:		
	 General Plan Policy Goal 5: "The aesthetic character of the region shall be protected 		
	and enhanced to provide a pleasing environment for residential, commercial,		
	recreational, and tourist activity."		
	 Agriculture is the main aesthetic character of the region. The open space 		
	aspect is valued and important.		
	 Imperial County Conservation and Open Space Element 2016 at page 40 (emphasis 		
	added): "Objective 8.2: Focus all new renewable energy development within adopted		
	Renewable Energy Overlay Zones."		
	 The Project is OUTSIDE that zone. 	ر -	
•	Ironically, the Thresholds of Significance were designed to disregard the significant impacts to		E.58
	the residents / property owners closest to the Project, for the benefit of developers.	Į	2.00
•	Methodology is generally manipulated to benefit the developers at the expense of the		E.59
	neighbors.	ل	
•	We strongly disagree with the manipulated conclusion that visual impacts represent a small degree of contrast with surroundings.		E.60
•	As long as zone changes, plan and overlay amendments, and CUPs are allowed and approved;)	
	and significant impacts to adjacent neighbors are deemed insignificant, then the following		
	claim made in the DEIR is hollow and unsupported by the facts at hand:		E.61
	o "However, projects located within private lands and/or under the jurisdiction of the		
	County of Imperial are being designed in accordance with the County of Imperial's	J	

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		_	
	General Plan and Land Use Ordinance, which includes policies to protect visual resources in the County."		E.61 cont'd
	Claiming that solar project impacts on farmland are temporary is ludicrous while allowing for	٦	
	indefinite permit extensions for allegedly new and improved technology.		
_	It is especially ludicrous when claiming that, unlike solar projects, impacts from industrial and		E.62
•	residential are permanent when, in fact, there are abandoned industrial and residential		
	properties throughout the Imperial Valley.	7	
•	"Footnote page 5-7: It should be noted that analysis of Other Land and Farmland of Local		
	Importance is not required under CEQA significance criteria, as these designations are not		E.63
	considered an "agricultural land" per CEQA Statute Section 21060.1(a)."		
•	It is alarming that CEQA does not consider Farmland of Local Importance as "agriculture land",		
	as noted in the footnote copied above. However, the local decision makers should consider it		
	when determining significance and cumulative impacts overall.	J	
	LIGHT, GLARE & GLINT)	
•	The attempt to downplay the Project impacts with the disingenuous description of glint and		
	glare from passing vehicles and farm equipment does not go unnoticed. Those impacts are very		E.64
	minor on such rural roads with very limited nighttime traffic.		L.04
•	The real issue is the potential for glint and glare from several hundred acres of fixed solar arrays,		
_	along with security night lighting that may be motion sensitive, represent a complete different		
	and more significant impact on Project neighbors, drivers, and farm workers in the immediate		
	area.	J	
	NOISE	ر آ	
_	The Cox farm employee housing and others homes are in close proximity to the project.		
•			E.65
•	It not always the loudness of the noise but often the low humming / vibrations from project		
	components that are the most annoying and can create a nuisance.		
•	The previous request to move the BESS and Substation to the southwest side of the site is		
	repeated here. Distance can reduce impacts and related nuisance.	J	
	BIOLOGICAL RESOURCES)	
•	The cumulative and potentially cumulatively considerable loss of foraging habitat through		
	farmland conversion and fallowing of cropland for water transfers should be addressed and		E.66
	analyzed, not just limiting the loss to Ormat's Brawley Solar project.		
	At times, the abundance and diversity of avian wildlife on existing farmland is a wonder to		
120	behold. That aspect is often overlooked but will be missed by locals and visitors when that		
	farmland and more is converted to industrial solar use.		
	ial mand and more is converted to muustriai soiai use.)	
	PUBLIC SERVICES		
•	See recycling /disposal comments	٦	E.67
•	Fire Protection Services	7	-
			E.68
		,	
_	Braudou Solar DEIR comments Cov Family DenBoo Farms & Packeountry Against Dumns 2		

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- Fire & Emergency Services mitigation should be included due to potential for difficult to fight toxic fires at the Brawley Solar project including the BESS and potential for cascading thermal runaway events that can generate Toxic Air Contaminants.
- 13.5 miles to the nearest fire station manned with only 3 firefighters may be too late to suppress BESS thermal runaway and related harm / damage.
- Brawley Solar must be required to provide specialized firefighting equipment and annual training for use of that equipment
- Wildfires: Our concerns are focused on the flammable PV panels and the BESS with potential for cascading thermal runaway fires with toxic smoke. Any project fire and burning embers could blow offsite and spread to adjacent homes, the New River bed, and any adjacent crops that are in a fire prone state at the time. It only takes a small breeze to move burning embers off site to trigger a wildfire.

SEISMIC & PUBLIC SAFETY

- Table 3.12-1. Goal 1: Include public health and safety considerations in land use planning; Objective 1.8: Reduce fire hazards by the design of new developments.
 - These goals would be better served by requiring Brawley Solar to move the proposed BESS and Substation from the southeast corner to the southwest corner to increase setbacks from existing homes on Best Road.
 - Internal fire suppression systems are good but they can and do fail.

CUMULATIVE IMPACTS

- Section 15130(a) of the CEQA Guidelines provides that "[A]n EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable..." Cumulatively considerable, as defined in Section 15065(a)(3), "means that 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 probable future projects."
- **CUMMULATIVELY CONSIDERABLE:** Brawley Solar contributes to the reported 25,945 acres of farmland converted for the 3,781 MW of alternative energy projects on the ICPDS Energy Project List – Alternative Power Projects 2021¹⁸.
 - Projects Operational: 26
 - **Projects Pending Construction: 8**
 - Projects Under Construction: 6
 - Projects in Entitlement Phase: 6
 - That list does not include the 13,000 or so acres of Ocotillo Express Wind project that surrounds the small community of Ocotillo:
- Table 5-1. Projects Considered in the Cumulative Impact Analysis

E.68 cont'd

E.69

E.70

E.71

County of Imperial

https://docs.google.com/spreadsheets/d/1zQqJ8b1AyB54WjyWQpwY94j7x6CMsL88/edit#gid=1288587879

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- The list of 29 projects considered is inadequate, according to the 49 or so listed /displayed on the Renewable Energy Maps posted on County's website¹⁹: Solar-Power-Northend-01-06-2022 and Solar-Power-Southend 09-29-2021.
- 5.3 Cumulative Impact Analysis
 - This section should address the cumulative impacts on local recycling and disposal facilities from the decommissioning and/or retrofitting of all the present, past, and reasonable foreseeable industrial scale solar projects in Imperial County.
 - At a minimum, the cumulative projects list should be analyzed.
 - Just the Campo Verde project alone has a reported 2.3 million cadmium telluride thin film photovoltaic modules, according to Southern Power²⁰
 - And Solar Gen 2 has more than one million of First Solar's thin-film photovoltaic (PV) solar modules mounted on single-axis tracking tables²¹

ALTERNATIVE SITES

Project location is NOT the Environmentally Superior Site:

Criteria for Alternatives Analysis

- Alternative site depicted on Figure 7-1.
- It appears that this site was specifically selected to provide predetermined justification so it could be rejected for the following reasons stated in the DEIR:
 - "The alternative location site, as compared to the proposed project site, is located immediately north of State Route 78, a major US State Highway traversed by large numbers of transient public viewers. When compared to the proposed project, the alternative site would result in potentially significant impacts associated with aesthetics and visual quality."
 - "Similarly, a glare hazard analysis prepared for the project (Appendix B of this EIR) concluded that sensitive viewers near the proposed project, including residences, a nearby golf course, major roadways, and approach slopes associated with the Brawley Municipal Airport, would not experience glare effects from the project. Comparatively, due to the alternative site location's close proximity immediately north of SR 78, potential glare impacts resulting from the solar array would be potentially significant to viewers traveling on SR 78."

7.4 Draft EIR | Alternative 1: No Project/No Development Alternative

• The NO Project / No Development Alternative is our preferred alternative because it reduces impacts to productive farmland.

Figure 7-2. Alternative 2: Development within Renewable Energy Overlay Zone – Agricultural Lands

E.71 cont'd

E.72

E.73

E.74

¹⁹ https://www.icpds.com/planning/maps/renewable-energy-maps

²⁰ CampoVerde_Solar_Facility_factsheet

²¹ SolarGEN2_Solar_Facility_factsheet

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- According to 7.8 Environmentally Superior Alternative, Alternative 2 would be the environmental superior alternative because it would reduce impacts for the following environmental issue areas as compared to the proposed project: aesthetics and agricultural resources.
- Alternative 2 could be our second preferred Alternative location. However, there is not enough information on the following issues:
 - o Ironically, Figure 7-2 fails to include the 20 or so large solar projects in the general area that are displayed on the County's Solar_Power_Northend map dated 1-06-2022²². They are color coded as Operational; Approved - Under Construction; Approved - Not Built and Pending Entitlement
 - How was the Alternative 2 site selected?
 - Were the owners of the site and adjacent non-participating neighbors informed or was the site selected at random?
 - How close are the nearest non-participating homes? That information is not clear from information provided in the DEIR.
 - What type of tree crops are growing there that show up in Google Maps (2022) that you can zoom in on?23
 - It IS located within the Renewable Energy Overlay Zone, on what appears to be much more marginal and previously disturbed land, near the east end of Young Road and County Road 8041 east of Calipatria.
 - Alternative 2 would meet most of the basic objectives of the proposed project.
 - However, the project applicant does not own, or otherwise control this property.
 - So why that potentially superior site was even considered as an alternative if lack of ownership disqualifies it?

7.6 Alternative 3: Development within Renewable Energy Overlay Zone - Desert Lands

- Again, the 20 or so large solar projects in the area are inexplicably left off the map showing the Alternative 3 location. See Solar Power Northend map dated 1-06-2022 footnoted under Figure 7.2
- This site seems to have been selected with an eye toward rejecting it as an option.

Thank you for consideration of these DEIR comments...

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E.74 cont'd

E.75

E.76

E.5

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²² ICPDS - Solar-Power-Northend-01-06-2022

²³https://www.google.com/maps/search/young+road+and+county+road+8041+imperial+valley+ca/@33.1353938,-115.3825367,1822m/data=!3m1!1e3?hl=en

Brawley Solar DEIR comments - Cox Family, DonBee Farms & Backcountry Against Dumps 2-10-22

Letter E

Donna (Cox) Tisdale, Michael Cox, Carolyn (Cox) Allen, Lawrence Cox; C/O Donbee Farms & on behalf of Backcountry Against Dumps
February 10, 2022

- **E.1** This comment expresses opposition to the proposed project. The County has evaluated all the potential impacts of the proposed project in accordance with the provisions of CEQA and recirculation of the EIR is not necessary pursuant to CEQA Guidelines Section 15162.
- E.2 At the time the photograph was taken (December 23, 2021), solar panels were stored on the Brawley Solar Energy Project site for the Wister Solar Project which is currently under construction. The solar panels were transported and assembled at the Wister Solar site. Materials storage is allowed on the site. Regardless, the applicant is not precluded from any purchase of equipment and materials, or services, or any investments related to the project, as this would occur at risk prior to the County's consideration of approval of the project. The project cannot be constructed prior to approval of the project and certification of the EIR by the County Planning Commission and Board of Supervisors. Otherwise, this comment does not raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required, and the comment is noted for the record.
- **E.3** This comment does not raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required, and the comment is noted for the record.
- **E.4** The project will involve the use of either a fiberoptic line or microwave tower. The text in the Final EIR has been revised as follows:

Page ES-1:

The proposed project would be comprised of bifacial solar PV arrays panels, an on-site, 92/12 kilovolt (kV) substation, 40 MW battery storage system (BESS), generation tie-line (gen-tie), fiberoptic line <u>or and microwave tower</u>, inverters, transformers, underground electrical cables, and access roads.

Page 2-4:

The proposed project would be comprised of bifacial solar PV arrays panels, an on-site substation, BESS, generation tie-line (gen-tie), fiberoptic line <u>or</u> and microwave tower, inverters, transformers, underground electrical cables, access roads. These project components are described in detail below and depicted in Figure 2-3.

Page 2-8:

- 2.3.5 Fiberoptic Cable or and Microwave Tower
- **E.5** The County aknowledges the commenter's preference for the fiberoptic line instead of the microwave tower.

Please refer to response to comment D.13 related to the relocation of the BESS, substation, fiberoptic line or microwave tower from the southwestern corner of the project site to the southcentral portion of the project site. As shown in the site plan, the substation would be located approximately 800 feet west of the closest residence.

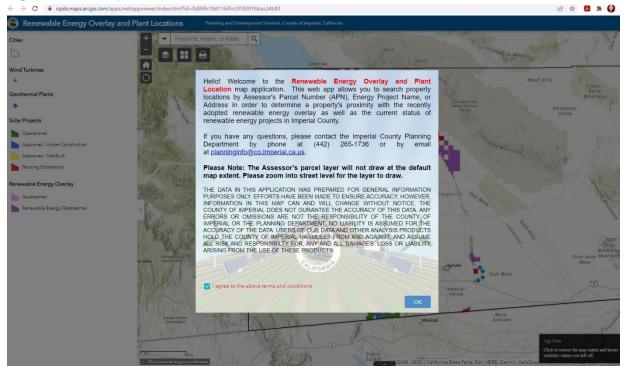
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The potential health impacts associated with the proposed project are analyzed in Section 3.4, Air Quality (see Impact 3.4-3) and Section 3.9, Hazards and Hazardous Materials (see Impact 3.9-1 and 3.9-2) of the Draft EIR. The EIR concludes that potential health impacts would be less than significant.

E.6 Please refer to response to comment D.2 related to the project's consistency with the Renewable Energy and Transmission Element.

With regards to the accuracy of the ICPDS Renewable Energy Overlay Zone and Project Map (Web Map), note that the Web Map application has a disclaimer pop-up, which opens up to the user prior to the use of the Web Map application. Please refer to Figure 1 below. The disclaimer clearly states, "information in this map can and will change without notice. The County of Imperial does not guarantee the accuracy of this data." No further response is required.





E.7 When approving an environmental document containing mitigation measures, the lead agency must adopt a mitigation monitoring and reporting program (MMRP) to ensure the measures falling under its responsibility are implemented. (CEQA Guidelines, § 15097.) The lead agency is responsible for ensuring that mitigation measures are implemented in accordance with the program. Pursuant to CEQA Guidelines, § 15097, as part of the project approval, the County will adopt an MMRP for the proposed project.

Project contact information will be posted at the project site and will be clearly visible from the public right of way.

E.8 Mitigation Measure AG-1a addresses the temporary conversion of agricultural lands by providing the applicant an option to provide agricultural conservation easement(s), payment of

an agricultural in-lieu mitigation fee which would be placed in a trust account administered by the Imperial County Agricultural Commissioner's office and used for such purposes as "acquisition, stewardship, preservation and enhancement of agricultural lands" or public benefit agreement, which requires an Agricultural Benefit Fee payment that would be used for "addressing the mitigation of agricultural job loss on the local economy, or emphasis on creation of jobs in the agricultural sector of the local economy for the purpose of off-setting jobs displaced by the Project. Option 4 would require avoidance of Prime Farmland. Mitigation Measure AG-1b addresses the restoration of the agricultural lands. These measures have been developed and approved by the Board of Supervisors as adequate mitigation to address the temporary conversion of agricultural lands for solar energy use within the County.

- E.9 Please refer to response to comment E.7 with regards to enforceability of mitigation measures. Mitigation Measure AG-1b will ensure that the project applicant adheres to the terms of the agricultural reclamation plan prepared for the project site, which would address the temporary agricultural land conversion impact. The Reclamation Plan will document the procedures by which the project site will be returned to its current agricultural condition, including soil conditions. The Permittee will also provide financial assurance/bonding in the amount equal to a cost estimate prepared by a California-licensed general contractor or civil engineer for implementation of the Reclamation Plan in the event Permittee fails to perform the Reclamation Plan.
- **E.10** Section 1.4.4 of the EIR identifies noise as an area of controversy. Section 1.4.4 of the Final EIR has been revised as follows to include waste:

"Through the environmental review process for this project, other areas of concern and issues to be resolved include potential impacts related to the conversion of farmland to non-agricultural uses, damage to crops, wildlife, water supply, fire hazards associated with the battery energy storage system, health effects from air pollution, noise, hazardous materials, waste, electromagnetic exposure safety, and change of visual character."

A Noise Impact Analysis was prepared to determine the noise impacts associated with the proposed project, and is provided as Appendix I of the EIR. The report analyzes the potential short-term construction- and operations-related noise impacts from the proposed project. Chapter 6, Effects Found Not Significant, of the EIR (pages 6-4 through 6-7 of the EIR) contains a summary of the Noise Impact Analysis.

The proposed PV solar panels do not create any operational noise, however the proposed BESS Enclosures (AC Unit noise), Power Conversion System, Power Distribution Center that would be located at the BESS, and auxiliary transformers, and Battery Step Up Transformer that would be located at the proposed substation are known sources of noise were analyzed. The noise levels from each source were calculated at the nearest homes, which includes the Cox farm employee housing. As shown on Table 6-2 of the EIR, the proposed project's onsite operational noise from the anticipated onsite noise sources would not exceed the applicable noise standards at the nearby homes. Operational onsite noise impacts would be less than significant.

The potential impacts of the proposed project on solid waste is provided on pages 6-8 through 6-9 of the EIR. The project would be required to comply with state and local requirements for waste reduction and recycling; including the 1989 California Integrated Waste Management Act and the 1991 California Solid Waste Reuse and Recycling Access Act of 1991. Also, conditions of the CUP would contain provisions for recycling and diversion of Imperial County

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construction waste policies. When the proposed project reaches the end of its operational life, the components would be decommissioned and deconstructed. The project components would be deconstructed and recycled or disposed of safely, and the site could be converted to other uses in accordance with applicable land use regulations in effect at the time of closure. Commercially reasonable efforts would be used to recycle or reuse materials from the decommissioning. All other materials would be disposed of at a licensed facility. A less than significant impact is identified for solid waste.

Please refer to response to comment D.15 with regards to potential health risks associated with electromagnetic fields.

E.11 This comment provides agricultural land loss and conversion statistics from the Department of Conservation. The commenter alleges that EIR Table 3.3-1, which shows the amount of agricultural land and acres converted to non-agricultural uses from 2016-2018 in Imperial County, is outdated and is deceptively low. The County disagrees with this statement as the information in EIR Table 3.3-1 is from the California Department of Conservation's most recent and available data set (2016-2018). The commenter later acknowledges that the DOC reports for 2018-2021 are not yet available. Therefore, the claim that that numbers in EIR Table 3.3-1 are outdated and deceptively low unsupported.

Please refer to response to comment D.10 with regards to the project's cumulative effects on agricultural resources.

- **E.12** This comment does not raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required, and the comment is noted for the record.
- **E.13** The County acknowledges the commentor's disagreement with the goals and objectives analysis provided in the Draft EIR as stated in this comment. However, the County disagrees that the project is not consistent with the relevant goals and objectives, an analysis of which are provided on Draft EIR Table 3.11-2 Project Consistency with Applicable Geeral Plan Policies. These consistency findings are consistent with other solar energy developments that have been reviewed and approved by the County.

Regarding stability of lithium batteries, please refer to response to comment E.29.

- **E.14** Please refer to response to comment D.13.
- **E.15** Section 2.4.2 of the Final EIR has been revised as follows:

"Material and equipment staging areas would be established on-site <u>or at the existing North</u>

<u>Brawley Geothermal Power Plant within an approximately 4-acre area.</u>

- **E.16** Please refer to response to comment E.9.
- E.17 It is not clear which mitigation measure the commenter is referring to in Table ES-1. Regardless, the proposed project would comply with state and local regulations for waste reduction and recycling. As stated on page 2-11 of the EIR, "Wastes generated during construction would be non-hazardous and may contain any of the following: cardboard, wood pallets, copper wire, scrap steel, common trash and wood wire spools, and as much as possible of the waste that is generated during construction would be recycled." Furthermore, on page 6-9 of the EIR, "...the project would be required to comply with state and local requirements for waste reduction and recycling; including the 1989 California Integrated Waste Management Act and the 1991 California Solid Waste Reuse and Recycling Access Act of

- 1991. Also, conditions of the CUP would contain provisions for recycling and diversion of Imperial County construction waste policies."
- **E.18** This comment does not raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required, and the comment is noted for the record.
- **E.19** Please refer to response to comment E.17.
- **E.20** The proposed project would be required to comply with state and local requirements for waste reduction and recycling at the time of recyling or disposal of project components (i.e., PV panels and batteries.
- **E.21** This comment states the operating efficiency of a CS3W module. This comment does not raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required, and the comment is noted for the record.
- **E.22** This comment is an excerpt from the Department of Toxic Susbtance Control's press release about California adding solar panels to its universal waste program. This comment does not raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required, and the comment is noted for the record.
- **E.23** This comment identifies the Universal Waste facilities that accept PV modules closest to the project site. While there are no Universal Waste Handlers that accept PV modules in Imperial County at this time, project decommissioning would not occur until 30 years, or more if the owner choooses to enter into a subsequent PPA or update technology and re-commission the facility. It is possible that a Universal Waste facility could be located in closer proximity to the project site (i.e., within Imperial County) by the time project decomissioning takes effect, but this is currently unknown and speculative. Regardless of timeframes, the project would be required to comply with all state and local requirements for waste reduction and recycling

When the proposed project reaches the end of its operational life, the components would be decommissioned and deconstructed. The project components would be deconstructed and recycled or disposed of safely, and the site could be converted to other uses in accordance with applicable land use regulations in effect at the time of closure. Commercially reasonable efforts would be used to recycle or reuse materials from the decommissioning. All other materials would be disposed of at a licensed facility.

- **E.24** This comment is an excerpt from the Harvard Business Review showing a graphic of the solar trash wave graph. This comment does not raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required, and the comment is noted for the record.
- **E.25** Please refer to response to comment D.14.
- **E.26** Please refer to response to comment E.9.
- **E.27** This comment does not raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required, and the comment is noted for the record.
- **E.28** Please refer to response to comment E.29.
- **E.29** There are various state of the art mechanisms that are installed at, and within, the BESSs in order to control the fire risk. BESSs collect and store power generated from facilities, such as solar farms and wind farms, to be used at a later time. While BESSs may be housed in various enclosures, shipping container-type portable units have become the predominant

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solution for lithium-ion battery storage due to their mobility, modularity, and weather-resistant properties.

The County of Imperial Fire Department recognizes this risk, and requirements for this project to mitigate the risk have been incorporated into the project. This includes the location of the proposed BESS so as to be accessible for fire department response, and so that it is not in immediate proximity to permanently occupied structures (e.g., existing residences). Please refer to the following Draft EIR pages that specifically address fire department requirements as they relate to the proposed project:

Page 1-3:

IMPERIAL COUTY FIRE DEPARTMENT

 Review as part of the EIR process including the final design of the proposed fire system

Page 2-11:

Fire protection systems for battery systems would be designed in accordance with California Fire Code and would take into consideration the recommendations of the National Fire Protection Association (NFPA) 855.

Fire suppression agents such as Novec 1230 or FM 2000, or water may be used as a suppressant. In addition, fire prevention methods would be implemented to reduce potential fire risk, including voltage, current, and temperature alarms. Energy storage equipment would comply with Underwriters Laboratory (UL)-95401 and test methods associated with UL-9540A. The project would include lithium-ion batteries. For lithium-ion batteries storage, a system would be used that would contain the fire event and encourage suppression through cooling, isolation, and containment. Suppressing a lithium-ion (secondary) battery is best accomplished by cooling the burning material. A gaseous fire suppressant agent (e.g., 3M™ Novec™ 1230 Fire Protection Fluid or similar) and an automatic fire extinguishing system with sound and light alarms would be used for lithium-ion batteries.

Water for fire suppression would be obtained from a ground storage tank existing onsite which fills from the Best Canal along the eastern property boundary.

To mitigate potential hazards, redundant separate methods of failure detection would be implemented. These would include alarms from the Battery Management System (BMS), including voltage, current, and temperature alarms. Detection methods for off gas detection would be implemented, as applicable. These are in addition to other potential protective measures such as ventilation, overcurrent protection, battery controls maintaining batteries within designated parameters, temperature and humidity controls, smoke detection, and maintenance in accordance with manufacturer guidelines. Remote alarms would be installed for operations personnel as well as emergency response teams in addition to exterior hazard lighting. In addition, an Incidence Response Plan would be implemented. Additionally, the project applicant would contribute its proportionate share for purchase of any fire-suppression equipment, if determined warranted by the County fire department for the proposed project.

Page 3.12-4:

The proposed project's BESS component would be placed on a 54,000 square-foot concrete pad. The BESS would consist of 12 banks of batteries totaling up to 432 enclosures. Each of the enclosures would utilize self-contained liquid cooling systems and include built-in fire suppression systems.

As discussed in Chapter 2, Project Description, primary access to the project site would be located off N Best Avenue. A secondary emergency access road would be located in the northwest portion of the project site. An all-weather surface access road would surround the perimeter of the project site, as well as around solar blocks no greater than 500 by 500 feet. Points of ingress/egress would be accessed via locked gates that can be opened by any emergency responders. Although the proposed project would be designed, constructed, and operated in accordance with applicable fire protection and other environmental, health, and safety requirements (e.g., CPUC safety standards), the project applicant will be required to consult and coordinate with the Fire Department to address any fire safety and service concerns (i.e, BESS) so that adequate service is maintained. Please also refer to response to comments D.13. While the proposed project may result in an increase in demand for fire protection service, with installation of internal fire prevention systems and ICFD consultation, the project would not result in an increase in demand that would, in turn, result in a substantial adverse physical impact associated with the provision of new or physically altered fire protection 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. Based on these considerations, the project would not result in a need for fire facility expansion and a less than significant impact would occur.

Imperial County requires payment of impact fees for new development projects. Fire Impact Fees are imposed pursuant to Ordinance 1418 §2 (2006), which was drafted in accordance with the County's TischlerBise Impact Fee Study. The ordinance has provisions for non-residential industrial projects based on square footage. The project applicant will be required to pay the fire protection services' impact fees. These fees would be included in the Conditions of Approval for the CUP. No new fire stations or facilities would be required to serve the project. Impacts would therefore be less than significant.

As indicated in the Draft EIR text above, the County recognizes that the BESS shipping containers pose a significant fire and explosion hazard, without implementation of mitigating factors to mitigate the risk to below of level of significance. A specific mitigation strategy will be required to address the potential for fire or explosion associated with the BESS.

Nearly all BESSs are equipped with a battery management system (BMS), which ensures batteries operate within safe temperatures. Some of these systems shut off power if elevated temperatures are detected. However, BMSs cannot be relied on as the only form of protection from an explosion or fire because once thermal runaway occurs, it cannot be stopped without fire suppression systems. Therefore, as discussed in the Draft EIR, to mitigate potential hazards, redundant separate methods of failure detection would be implemented. These would include alarms from the Battery Management System (BMS), including voltage, current, and temperature alarms. Detection methods for off gas detection would be implemented, as applicable. These are in addition to other potential protective measures such as ventilation, overcurrent protection, battery controls maintaining batteries within designated parameters, temperature and humidity controls, smoke detection, and maintenance in accordance with manufacturer guidelines. Remote alarms would be installed for operations personnel as well

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- as emergency response teams in addition to exterior hazard lighting. In addition, an Incidence Response Plan would be implemented.
- **E.30** Please refer to response to comment E.29.
- **E.31** Please refer to response to comment D.13.
- **E.32** Please refer to response to comment E.29.
- **E.33** Please refer to response to comment E.17.
- **E.34** Please refer to response to comment E.29.
- **E.35** The issues identified in this comment "electrical noise", "high magnetic fields" and "radio frequency radiation" are associated with home/private solar systems (e.g., rooftop solar) and related inverters, and is not a known occurrence from utility-scale solar power.
- **E.36** Please refer to response to comment D.13.
- **E.37** Please refer to response to comment D.13.
- **E.38** Please refer to response to comment D.5.
- **E.39** Depending on several factors the project may utilize a fiber optic line for remote communication or a communication tower. The fiber optic line would be located within the same alignment as the proposed gen-tie line.
- E.40 Comment noted.
- **E.41** Please refer to response to comment D.13.
- E.42 The proposed project would be required to adhere to County's Land Use Ordinance Code, which provides specific direction for lighting requirements. Specifically, *Division 17: Renewable Energy Resources, Section 91702.00 Specific Standards for All Renewable Energy Projects* requires the following:
 - (R) Lights should be directed or shielded to confine direct rays to the project site and muted to the maximum extent consistent with safety and operational necessity.

Compliance with the County's Land Use Ordinance Code would confine direct light rays to the project site to minimize and avoid light spilling/trespassing over into areas outside of the project site.

- **E.43** Please refer to responses to comments D.13 and E.68.
- **E.44** Please refer to responses to comments E.15.
- **E.45** Please refer to responses to comments E.15.
- **E.46** Section 2.4.2 of the Final EIR has been revised as follows: "Construction is anticipated to start in quarter four of <u>2022</u>2021 and would take approximately 6-9 months to complete."
- **E.47** A Water Supply Assessment (WSA) has been prepared for the proposed project, and is provided in Appendix H of the EIR. This WSA has been prepared pursuant to the requirements of CWC Section 10910, as amended by Senate Bill (SB) 610 (Costa, Chapter 643, Stats. 2001). The purpose of SB 610 is to advance water supply planning efforts in the State of California, therefore SB 610 requires the lead agency (ICPDS), to identify any public water

system or water purveyor that may supply water for the project, to prepare the WSA after a consultation.

As described on page 3.15-1 of the EIR, the project site is located within IID's Imperial Unit and district boundary and as such is eligible to receive water service. IID has adopted an Interim Water Supply Policy (IWSP) for Non-Agricultural Projects, from which water supplies can be contracted to serve new developments within IID's water service area. The IWSP designates up to 25,000 acre-feet annually (AFY) of IID's annual Colorado River water supply for new non-agricultural projects, provides a mechanism and process to develop a water supply agreement for any appropriately permitted project, and establishes a framework and set of fees to ensure the supplies used to meet new demands do not adversely affect existing users by funding water conservation or augmentation projects, as needed.

The project is expected to consume 151.8 acre-feet for the 30-year lifespan of the project which would equate to 5.06 AFY amortized representing 0.02% of the annual unallocated supply set aside for new non-agricultural projects. Thus, the proposed project's estimated water demand would not affect IID's ability to provide water to other users in IID's water service area. Therefore, the proposed project would have sufficient water supplies available to serve the project from existing entitlements and resources.

With regards to the water well onsite, the Department of Conservation has identified it as an idle water well. According to the California Department of Conservation, an idle well is defined as:

"[A]ny well that for a period of 24 consecutive months has not either produced oil or natural gas, produced water to be used in production stimulation, or been used for enhanced oil recovery, reservoir pressure management, or injection. For the purpose of determining whether a well is an idle well, production or injection is subject to verification by the division." (Pub. Resources Code, § 3008, subd. (d).)"1

Based on the sufficient water supplies available to serve the project from the IWSP, the project would not source construction water from the idle water well onsite.

- **E.48** Please refer to response to comment D.6.
- **E.49** All exposed surfaces (e.g., houses, cars, rocks) absorb heat produced by the sun. A "heat island" effect is generated when land is covered with structures (e.g., concrete buildings and asphalt roads) which absorb and store significantly more heat during the day than the undeveloped earth surface. Additionally, these developed areas are often filled with energy-consuming devices (e.g., engines, appliances, and heating, air-conditioning, and ventilation [HVAC] systems) that generate waste heat.

Solar arrays consist of PV panels mounted on aluminum and steel support structures, restricting sunlight from reaching the ground surface. Additionally, the amount of the sun's heat absorbed by a solar panel is similar to the amount of the sun's heat absorbed by open land. However, solar panels store less heat than the earth because they consist of a thin, lightweight glass that is surrounded by airflow. Therefore, heat dissipates quickly from a solar panel compared with solid earth, which dissipates heat slowly. The project would also include

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 $[\]frac{\text{https://www.conservation.ca.gov/calgem/idle_well\#:} \sim :\text{text=Idle}\% 20 \text{Well}\% 20 \text{Definitions} \& \text{text=}\% 22 \% 5 \text{BA}}{\% 5 \text{Dny}\% 20 \text{well}\% 20 \text{that,reservoir}\% 20 \text{pressure}\% 20 \text{management}\% 2C \% 20 \text{or}\% 20 \text{injection}}$

energy-consuming devices (e.g., inverters) that could generate marginal amounts of waste heat. There is nothing in the record to date that would indicate that the project would significantly increase ambient air temperatures outside the project site. Fthenakis and Yu from Columbia University and Brookhaven National Laboratory combined models with field data to determine the extent to which PV facilities altered ambient air temperatures (Fthenakis and Yu 2013). Temperatures surrounding the facility were found to cool completely at night and the researchers determined that the PV facility "did not induce a day-after-day increase in ambient temperatures, and therefore, adverse micro-climate changes from a potential PV plant are not a concern." This study also concluded that increases in temperatures completely dissipated approximately 5-18 meters above the facility and that thermal energy "promptly dissipated" with distance from the facility. Remote sensing research produced by Edalat and Stephen from UNLV in 2017 supports the conclusions of Fthenakis and Yu (2013), demonstrating that land surface temperatures surrounding a solar facility were not significantly impacted by the solar facility (Edalat and Stephen 2017).

- **E.50** Impact 3.3-3 (page 3.3-13) of the EIR provides an analysis of the potential for weeds and pests to occur on the project site. Prior to the issuance of a grading permit or building permit (whichever occurs first), a Pest Management Plan shall be developed by the project applicant and approved by the County of Imperial Agricultural Commissioner, per Mitigation Measure AG-2. The Plan would include monitoring, preventative, and management strategies for weed and pest control during construction activities; control and management of weeds and pests; and a long-term strategy for weed and pest control and management during the operation of the project. Implementation of Mitigation Measure AG-2 would reduce this impact to a level less than significant.
- **E.51** Please refer to response to comment E.11.
- **E.52** The assessment of visual quality is a subjective matter, and reasonable people can disagree as to whether alteration in the visual character of the project area would be adverse or beneficial. However, based on the methodology and approach to the visual impact assessment, a less than significant impact was identified related to the change in visual character as a result of the project.
- **E.53** Any future project expansion would require additional discretionary approvals from the County. For example, the application of another CUP would be subject to additional CEQA review at the time an application is filed with the County.
- **E.54** Page 3.2-5 of the Final EIR has been revised to add a figure label for KOP 2 as "Figure 3.2-3: Existing Key Observation Point 2".
- **E.55** Page 3.2-6 of the Final EIR has been revised to add a figure label for KOP 4 as "Figure 3.2-5: Existing Key Observation Point 4".
- **E.56** The project simulations for KOP 3 and KOP 4 are shown correctly on Figure 3.2-8 and Figure 3.2-9, respectively. Figure 3.2-8 shows the proposed gen-tie structures in the center of the view, traveling from east to west. Figure 3.2-9 shows the proposed gen-tie structures on the right side of the view.
- **E.57** See response to comment E.52.
- **E.58** This comment alleges that the thresholds of significance were designed to disregard the significant impacts to residents/property owners closest to the project, for the benefit of developers. CEQA requires a Lead Agency to determine the significance of all environmental

impacts (California Public Resources Code [PRC] § 21082.2; 14 CCR [State CEQA Guidelines] § 150641). A threshold of significance for a given environmental impact defines the level of effect above which the Lead Agency will normally consider impacts to be significant, and below which it will normally consider impacts to be less than significant (See State CEQA Guidelines § 15064.7(a)). Thresholds of significance may be defined either as quantitative or qualitative standards, or sets of criteria, whichever is most applicable to each specific type of environmental impact.

Lead Agencies are responsible for establishing the thresholds of significance for all documents they prepare. They can rely on several sources, including: Appendix G of the State CEQA Guidelines; CEQA's mandatory findings of significance (State CEQA Guidelines § 15065); thresholds established by regulatory agencies; thresholds provided in General Plans or other local planning documents; or thresholds established by other agencies.

In the case of the EIR prepared for the proposed project, the thesholds of significance used to evaluate impacts are derived from Appendix G of the State CEQA Guidelines.

- **E.59** See responses to comments E.52 and and E.58.
- **E.60** See response to comment E.52.
- **E.61** Future projects subject to discretionary approvals such as Zone Changes, General Plan Amendments and CUPs would be subject to CEQA review from the County.
- **E.62** Mitigation Measure AG-1b will ensure that the project applicant adheres to the terms of the agricultural reclamation plan prepared for the project site, which would address the temporary agricultural land conversion impact. The Reclamation Plan will document the procedures by which the project site will be returned to its current agricultural condition. The Permittee will also provide financial assurance/bonding in the amount equal to a cost estimate prepared by a California-licensed general contractor or civil engineer for implementation of the Reclamation Plan in the event Permittee fails to perform the Reclamation Plan.
- **E.63** The EIR adequately identifies and analyzes the project's potential impacts on agricultural land, as defined in CEQA Statute Section 21060.1(a):

"Agricultural land" means prime farmland, farmland of statewide importance, or unique farmland, as defined by the United States Department of Agriculture land inventory and monitoring criteria, as modified for California.

Per CEQA Guidelines Appendix G significance criteria, project impacts are considered significant if the project would "convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance as shown on the maps prepared pursuant to the FMMP of the California Resources Agency, to non-agricultural use." Therefore, analysis of Farmland of Local Importance is not required under CEQA significance criteria because it does not meet the definition of "agricultural land" per CEQA Statute Section 21060.1(a).

E.64 A glare hazard analysis was prepared for the project by Power Engineers and is provided in Appendix B of the EIR. Power Engineers evaluated the proposed project to ensure Federal Aviation Administration (FAA) compliance regarding hazardous solar glare in or around airports. In addition to airport operations, Power Engineers analyzed potential glare that would cause distraction to nearby motorists and structures. The following sensitive viewers were analyzed and are shown on Appendix A – Project Location of the Glare Hazard Analysis (see Appendix B of the EIR) and provided as Figure 2 below:

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- Brawley Municipal Airport
- Structures Nearby residences and structures up to one mile from the project site
- Major Roadways N. Best Avenue, Highway 111, Ward Road, and Rutherford Road

Power Engineers used GlareGauge licensed by ForgeSolar. The GlareGauge uses Solar Glare Hazard Analysis Tool technology and is a web-based glare assessment tool allowing input of viewer position, solar facility location, solar technology, and elevation data. The GlareGauge provides a quantified assessment of when and where glare may occur throughout the year from a solar installation, as well as identifying the potential effects on the human eye when glare does occur. Glare was analyzed at one-minute intervals throughout the entire year to determine when and where glare may be visible to residences, motorists, and pilots. The GlareGauge meets FAA glare analysis requirements.

As described in the Glare Hazard Analysis and page 3.2-15 of the EIR, the glare analysis concluded that sensitive viewers near the project including residences and major residences would not experience glare effects from the project.

Figure 2. Sensitive Viewers Analyzed in Glare Hazard Analysis





Brawley Solar Energy Facility Glare Analysis

Project Location - Appendix A

With regards to security night lighting, the proposed project would be required to adhere to County's Land Use Ordinance Code, which provides specific direction for lighting

requirements. Specifically, *Division 17: Renewable Energy Resources, Section 91702.00 – Specific Standards for All Renewable Energy Projects* requires the following:

(R) Lights should be directed or shielded to confine direct rays to the project site and muted to the maximum extent consistent with safety and operational necessity.

Compliance with the County's Land Use Ordinance Code would confine direct light rays to the project site to minimize and avoid light spilling/trespassing over into areas outside of the project site.

E.65 A Noise Impact Analysis was prepared to determine the noise impacts associated with the proposed project, and is provided as Appendix I of the EIR. The report analyzes the potential short-term construction- and operations-related noise impacts from the proposed project. Chapter 6, Effects Found Not Significant, of the EIR (pages 6-4 through 6-7 of the EIR) contains a summary of the Noise Impact Analysis.

The proposed PV solar panels do not create any operational noise, however the proposed BESS Enclosures (AC Unit noise), Power Conversion System, Power Distribution Center that would be located at the BESS, and auxiliary transformers, and Battery Step Up Transformer that would be located at the proposed substation are known sources of noise were analyzed. The noise levels from each source were calculated at the nearest homes, which includes the Cox farm employee housing. As shown on Table 6-2 of the EIR, the proposed project's onsite operational noise from the anticipated onsite noise sources would not exceed the applicable noise standards at the nearby homes. Operational onsite noise impacts would be less than significant. With regards to vibration impacts, as described on page 6-7 of the EIR, the ongoing operation of the proposed project would not include the operation of any known vibration sources. Therefore, a less than significant vibration impact is identified during operation of the project. Based on these considerations, the BESS and substation would not result in significant noise impacts on sensitive receptors from their proposed locations on the project site.

- **E.66** Potential cumulative impacts to biological resources is addressed on Draft EIR pages 5-10 through 5-11.
- **E.67** Please refer to responses to comments E.17 and E.23.
- **E.68** The project's potential impacts on fire protection services is analyzed in Impact 3.12-1 (pages 3.12-4 through 3.12-5 of the EIR). The project applicant will be required to consult and coordinate with the Fire Department to address any fire safety and service concerns (i.e, BESS) so that adequate service is maintained.

Proposed project facilities would be designed, constructed, and operated in accordance with applicable fire protection and other environmental, health, and safety requirements (e.g., CPUC safety standards). Impact 3.9-2 (page 3.9-9) identifies the potential fire risk of the BESS and fire protection systems that would minimize and mitigate potential fires. Fire risk will be mitigated through monitoring and a fire suppression system that includes water and or a suppression agent (eg FM-200, Novatech) with smoke detectors, control panel, alarm, piping and nozzles. The fire protection system will be designed by a certified fire protection engineer and installed by a fire protection system contractor licensed in California and in accordance with all relevant building and fire codes in effect in the County at the time of building permit submission. Fire protection systems for battery systems would be designed in accordance with California Fire Code and would take into consideration the recommendations of the National Fire Protection Association (NFPA) 855.

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To mitigate potential hazards, redundant separate methods of failure detection would be implemented. These would include alarms from the Battery Management System (BMS), including voltage, current, and temperature alarms. Detection methods for off gas detection would be implemented, as applicable. These are in addition to other potential protective measures such as ventilation, overcurrent protection, battery controls maintaining batteries within designated parameters, temperature and humidity controls, smoke detection, and maintenance in accordance with manufacturer guidelines.

- **E.69** According to the Seismic and Public Safety Element of the General Plan (County of Imperial 1997), the potential for a major fire in the unincorporated areas of the County is generally low. Please also refer to response to comment E.70.
- **E.70** Please refer to responses to comments D.13 and E.68.
- **E.71** The cumulative projects listed in the Draft EIR are reflective of the projects known to the County upon release of the Notice of Preparation.
- **E.72** Comment noted. As discussed in the Draft EIR, this alternative was rejected from detailed analysis.
- **E.73** This comment expresses the commenter's preferrence of the No Project/No Development Alternative because it reduces impacts to farmland. This comment does not raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required, and the comment is noted for the record.
- **E.74** The Alternative 2 site was considered, as explained in the Draft EIR (see pages 7-8 and 7-9), for a location that would be entirely within the County's RE Overlay Zone, and otherwise unecumbered based on currently available information. The location is shown irrespective of other cumulative projects that may be located in the general area. CEQA requires a reasonable range of alternatives, which could avoid or lessen the significant impacts of the proposed project. This alternative location was included in the Draft EIR as a potential alternative that could meet that criteria, regardless of whether the applicant controls the property.
- **E.75** The Alternative 3 location figure provided in the Draft EIR is intended to depict the location of the off-site location analyzed in the EIR, and not the location of cumulative projects.
- **E.76** Comment acknowledged.

0.2 Response to Comments Final EIR | Brawley Solar Energy Facility Project

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August 25, 2022

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e: Failure to Respond to Public Comments on the Draft
Environmental Impact Report – Brawley Solar Energy Facility
(SCH # 2021070424) (CUP No. #20-0030, GPA#21-0003, ZC#210003, and WSA)

Dear Mr. Minnick and Mr. Black:

On behalf of Citizens for Responsible Industry ("Citizens"),¹ we are writing to inform Imperial County (County") that the Final Environmental Impact Report ("FEIR") for the Brawley Solar Energy Facility, SCH # 2021070424, CUP No. #20-0030, GPA#21-0003, ZC#21-0003, and WSA ("Project")² fails to include responses respond to Citizens' February 10, 2022 comments and expert comments on the

Intro F.1

¹ Citizens is a coalition of individuals and labor organizations whose members encourage sustainable development of California's energy and natural resources. The coalition includes Imperial County residents and other members and organizations, including California Unions for Reliable Energy ("CURE") and its local affiliates, and the affiliates' members who live, recreate, work, and raise families in Imperial County and in communities near the Project site. Citizens, its participating organizations, and their members stand to be directly affected by the Project's impacts.

² The Project, proposed by Ormat Nevada, Inc. (d.b.a. ORNI 30, LLC) ("Applicant"), includes a 40-megawatt ("MW") solar photovoltaic ("PV") energy facility, 40-MW battery energy storage system ("BESS"), onsite 92/12 kilovolt (kV) substation, generation tie-line ("gen-tie") connecting the substation to the Imperial Irrigation District's ("IID") existing North Brawley Geothermal Power Plant substation, fiberoptic line and microwave tower, inverters, transformers, underground electrical cables, and access roads. The Project is proposed to be located on approximately 227 acres of privately-owned land in unincorporated Imperial County approximately one mile north of the City of Brawley

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August 25, 2022 Page 2

Project's Draft Environmental Impact Report ("DEIR"), in violation of the California Environmental Quality Act ("CEQA").

Citizens' DEIR comments were filed on February 10, 2022, during the DEIR public comment period and addressed significant environmental issues related to the Project and were submitted during the public comment period on the DEIR. Accordingly, the County was required to evaluate Citizen's DEIR comments and include written responses to Citizens' comments in the FEIR.³ The FEIR fails to identify Citizens as a commenter,⁴ and fails to reproduce or respond to Citizens' DEIR comments, or the comments of its experts, in any way.⁵ This is a violation of CEQA's mandates regarding public process and the content of the FEIR.⁶

The County must revise the FEIR to provide written responses to Citizen's comments, and should also revise and recirculate the DEIR in response Citizens' comments to properly disclose, analyze, and mitigate the Project's significant impacts.

I. THE FEIR FAILS TO ADDRESS PUBLIC COMMENTS PROVIDED DURING THE PUBLIC REVIEW PERIOD, IN VIOLATION OF CEQA

CEQA requires that a lead agency evaluate and prepare written responses to comments in a FEIR.⁷ All public comments submitted on a DEIR that raise environmental issues must both: (1) be evaluated by the lead agency; and (2) have written responses prepared by the lead agency describing the disposition of each significant environmental issue raised by said comments.⁸ When a comment raises a significant environmental issue, the lead agency must address the comment in detail. "There must be good faith, reasoned analysis in response. Conclusory statements unsupported by factual information will not suffice." Failure of a lead agency to respond to comments before approving a project frustrates CEQA's informational purpose, rending an EIR legally inadequate.¹⁰

Intro F.1 cont'd

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³ Cal. Pub. Res. Code § 21091(d); 14 Cal. Code Regs §§ 15088(a), 15132.

⁴ 14 Cal. Code Regs § 15132(c).

⁵ 14 Cal. Code Regs §§ 15088(a), (c); 15132(b)-(d).

⁶ *Id*.

 $^{^7}$ Cal. Pub. Res. Code § 21091(d); 14 Cal. Code Regs §§ 15088(a), 15132.

⁸ Id.

⁹ The Flanders Foundation v. City of Carmel-by-the-Sea (2012) 202 Cal. App. 4th 603, 615; CEQA Guidelines, § 15088(c); see Laurel Heights Improvement Assn. v. Regents of University of California (1993) 6 Cal.4th 1112, 1124.

¹⁰ Id.; Rural Landowners Ass'n v. City Council (1983) 143 Cal.3d 1013, 1020.

August 25, 2022 Page 3

The County's Notice of Availability for the DEIR provided a 45-day public comment period from "December 27, 2021 through February 10. 2022," specifying that comments must be received by February 10, 2022 to be included in the FEIR.¹¹

On February 10, 2022, 12 Citizens' electronically submitted their DEIR comments to the County. 13 Citizens' DEIR comments consisted of a 45-page comment letter, accompanied by three expert reports from air quality and hazardous resources experts Matt Hagemann, P.G., C.Hg. and Paul E. Rosenfeld, Ph.D., of Soil Water Air Protection Enterprise ("SWAPE"), wildlife ecologist and biological resources expert Shawn Smallwood, Ph.D., and agricultural resources experts Gregory and Henry House. 14 Citizens' DEIR comments addressed errors and omissions in the DEIR's environmental analysis, and identified significant environmental and public health impacts that required additional analysis and mitigation pursuant to CEQA. The comments were timely submitted during the Project's CEQA public comment period on the DEIR. Accordingly, the County was required to consider and respond to Citizens' comments in the FEIR. 15

The FEIR includes responses to at least 5 other public comment letters, as required by CEQA.¹⁶ However, the FEIR fails to mention or include any responses to Citizens' comments or the comments of its experts. The County's failure to respond to Citizens' timely submission of comments on the DEIR during the prescribed public comment period is a violation of CEQA. The County's failure to respond to Citizens' comments is also a violation of Citizens' rights to participate in the CEQA public review process, and has severely prejudiced Citizens' ability to meaningfully review and comment on the EIR. These violations must be remedied in a revised EIR.

II. CONCLUSION

The FEIR fails to comply with the public comment process as required in CEQA and thus must be revised to address all comments received during the public

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Intro F.1 cont'd

¹¹ See 12/27/2021 Notice of Availability of a Draft Environmental Impact Report For the Brawley Solar Energy Facility Project, available at https://ceqanet.opr.ca.gov/2021070424/2/Attachment/tiiygz (last visited 8/24/22).

 $^{^{12}}$ See **Attachment B**: Email from ACP to David Black and Jim Minnick regarding Public Comments on the DEIR, February 10, 2022.

¹³ PRC § 21091(d)(3)(A) (CEQA requires lead agency to accept DEIR comments via email and to treat email comments as equivalent to written comments).

¹⁴ Attachment A: ABJC public comments regarding the DEIR, Feb. 10, 2022.

¹⁵ PRC § 21091(d)(1).

¹⁶ FEIR, p. 02.-3.

 $\begin{array}{c} {\rm August~25,~2022} \\ {\rm Page~4} \end{array}$

comment period. We request that all hearings on the Project be postponed until the FEIR is revised to comply with CEQA.

Intro F.1 cont'd

Sincerely,

Darien K. Key

Attachments

DKK:acp

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ATTACHMENT A

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> Re: Comments on the Draft Environmental Impact Report – Brawley Solar Energy Facility (SCH # 2021070424) (CUP No. #20-0030, GPA#21-0003, ZC#21-0003, and WSA)

Dear Mr. Minnick and Mr. Black:

On behalf of Citizens for Responsible Industry ("Citizens") we submit these comments on the draft environmental impact report ("DEIR") for the Brawley Solar Energy Facility, SCH # 2021070424, CUP No. #20-0030, GPA#21-0003, ZC#21-0003, and WSA ("Project") located in unincorporated Imperial County. Proposed by Ormat Nevada, Inc. (d.b.a. ORNI 30, LLC) ("Applicant"), the Project includes a 40-megawatt ("MW") solar photovoltaic ("PV") energy facility, 40-MW battery energy storage system ("BESS"), onsite 92/12 kilovolt (kV) substation, generation tie-line ("gen-tie") connecting the substation to the Imperial Irrigation District's ("IID") existing North Brawley Geothermal Power Plant substation, fiberoptic line and microwave tower, inverters, transformers, underground electrical cables, and access roads.¹

The Project is located on approximately 227 acres of privately-owned land in unincorporated Imperial County approximately one mile north of the City of Brawley, on five parcels with Assessor Parcel Numbers 037-140-006, -020, -021, -

¹ DEIR, p. 1-1. 5365-005acp

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F.2

F.3

022, and -023. The Project site is adjacent to the City of Brawley Wastewater Treatment Plant and the New River.

The proposed solar facility would be comprised of solar bifacial high-power dual cell PV panels organized into 13 blocks. The BESS would be placed on a 54,000-square-foot concrete pad at the southern edge of the project site and would consist of 12 banks of batteries totaling up to 432 enclosures. Each bank of batteries would be supported by a DC Combiner, control panel, and inverter/transformer skid and each enclosure would utilize self-contained liquid cooling systems and include built-in fire suppression systems. All batteries would be lithium-ion based capable of storing 40 MW (not to exceed 80 MW).² The proposed substation would be located at the southern edge of the Project site, adjacent to the BESS. The substation control room would house the Supervisory Control and Data Acquisition ("SCADA") system, switchgear, breakers, and direct current ("DC") batteries, as well as a 20-kV emergency backup generator. Six-foot-high chain link fencing topped with barbed wire would be installed around the perimeter of the Project site. Construction would last approximately 6 to 9 months.³

The Project would connect to a switchyard located at the southern edge of the site and then route through the BESS for energy storage. The power produced by the proposed Project would then be transferred via a 1.8-mile double circuit 13.8 and 92 kV gen-tie line with 66-foot-high poles spanning the New River and interconnecting to the Imperial Irrigation District's ("IID") existing North Brawley Geothermal Power Plant substation southwest of the Project site. According to the DEIR, the Applicant intends to secure a Power Purchase Agreement with utility service providers for the sale of power from the Project.⁴

The Project would require the following discretionary approvals from the County:

- Approval of a conditional use permit ("CUP") to allow for the construction and operation of the proposed solar energy facility with an integrated battery storage system.
- General Plan Amendment and Zone Change to include all five parcels in the Renewable Energy ("RE") Overlay Zone to comply with the requirement that

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F.3 cont.

² DEIR, p. 2-7.

³ DEIR, p. 2-10.

⁴ DEIR, p. 2-13.

⁵³⁶⁵⁻⁰⁰⁵acp

specific renewable energy projects seeking a CUP must be located within the RE Overlay Zone.

F.3 cont.

F.4

Based on our review, we have determined that the DEIR fails to meet the requirements of CEQA for the following reasons:

- 1. Failure to provide an adequate Project Description
- 2. Failure to accurately describe the existing environmental setting

3. Failure to identify, analyze and mitigate potentially significant Project impacts to air quality, agricultural resources, land use and planning, public health, biological resources, and from cumulative impacts

4. Failure to propose mitigation measures that are definite, effective, and not impermissibly deferred.

The County must revise the DEIR in order to correct these deficiencies and to properly disclose, analyze, and mitigate the Project's significant impacts. A revised DEIR that thoroughly analyzes all significant Project impacts must be recirculated for public review and comment.

F.5

We reviewed the DEIR and accompanying technical reports and appendices with the assistance of air quality and hazardous resources experts Matt Hagemann, P.G., C.Hg. and Paul E. Rosenfeld, Ph.D., of Soil Water Air Protection Enterprise ("SWAPE"),⁵ as well as wildlife ecologist and biological resources expert Shawn Smallwood, Ph.D,⁶ and agricultural resources experts Gregory and Henry House.⁷ Comment letters and curriculum vitae from SWAPE, Dr. Smallwood, and Mr. House are fully incorporated and attached hereto and are submitted to the County in addition to the comments in this letter. Accordingly, the County must address

F.6

County of Imperial

 $^{^7}$ Letter to Kendra Hartmann, Adams Broadwell Joseph & Cardozo from Gregory and Henry House re: Draft Environmental Impact Report, Brawley Solar Project (February 8, 2022) (hereinafter "House Comments"), attached as **Exhibit C**. 5365-005acn



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⁵ Letter to Kendra Hartmann, Adams Broadwell Joseph & Cardozo from Matt Hagemann and Paul Rosenfeld, SWAPE, re Comments on the Brawley Solar Energy Facility Project (February 4, 2022) (hereinafter "SWAPE Comments"), attached as **Exhibit A**.

⁶ Letter to Kendra Hartmann, Adams Broadwell Joseph & Cardozo from Shawn Smallwood re: Comments on the Brawley Solar Project (February 9, 2022) (hereinafter "Smallwood Comments"), attached as Exhibit B.

and respond to each comment letters separately. We reserve the right to supplement these comments at later hearings on this Project.8

F.6 cont.

I. STATEMENT OF INTEREST

Citizens is a coalition of individuals and labor organizations whose members encourage sustainable development of California's energy and natural resources. The coalition includes Imperial County residents and other members and organizations, including California Unions for Reliable Energy ("CURE") and its local affiliates, and the affiliates' members who live, recreate, work, and raise families in Imperial County and in communities near the Project site. Thus, Citizens, its participating organizations, and their members stand to be directly affected by the Project's impacts

CURE supports the development of renewable energy and the critical role it plays in the effort to reduce greenhouse gas emissions. Since its founding in 1997, CURE has been committed to building a strong economy and healthier environment and it works to construct, operate, and maintain renewable energy power plants and other facilities throughout California. CURE supports the development of clean, renewable energy technology, including solar power generation, where properly analyzed and carefully planned to minimize impacts on public health and the environment. Development of all projects subject to CEQA should take all feasible steps to ensure unavoidable impacts are mitigated to the maximum extent feasible. Only by maintaining the highest standards can energy produced from the development of new solar installations truly be sustainable.

The individual members of Citizens, including Brawley residents Jose Favela, Roberto Galvan, and Hector Meza, would be directly affected by the Project and may also work constructing the Project itself. They would therefore be first in line to be exposed to any health and safety hazards that may be present on the Project site. The coalition includes members who live, recreate, work, and raise families in Imperial County and in communities near the Project site. They each have a personal stake in protecting the Project area from unnecessary, adverse environmental and public health and safety impacts. Citizens, its participating

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F.7

⁸ Goy, Code § 65009(b); Cal. Pub. Res. Code ("PRC") § 21177(a); Bakersfield Citizens for Local Control v. Bakersfield ("Bakersfield") (2004) 124 Cal. App. 4th 1184, 1199-1203; see Galante Vineyards v. Monterey Water Dist. (1997) 60 Cal. App. 4th 1109, 1121.

organizations, and their members stand to be directly affected by the Project's impacts.

Finally, the organizational members of Citizens are concerned with projects that can result in serious environmental harm without providing countervailing economic benefits. CEQA provides a balancing process whereby economic benefits are weighed against significant impacts to the environment. It is in this spirit we offer these comments.

F.7 cont.

II. LEGAL BACKGROUND

CEQA requires that an agency analyze the potential environmental impacts of its proposed actions in an EIR, except in limited circumstances.9 The EIR is the very heart of CEQA. 10 "The foremost principle in interpreting CEQA is that the Legislature intended the act to be read so as to afford the fullest possible protection to the environment within the reasonable scope of the statutory language."11

CEQA has two primary purposes. First, CEQA is designed to inform decisionmakers and the public about the potential, significant environmental effects of a project. $^{12,\,13}$ CEQA's purpose is to inform the public and its responsible officials of the environmental consequences of their decisions before they are made. In this respect, an EIR "protects not only the environment but also informed selfgovernment."14 The EIR has been described as "an environmental 'alarm bell' whose purpose it is to alert the public and its responsible officials to environmental changes before they have reached ecological points of no return."

To fulfill this function, the discussion of impacts in an EIR must be detailed, complete, and "reflect a good faith effort at full disclosure." ¹⁵ CEQA requires an EIR

¹⁵ CEQA Guidelines § 15151; San Joaquin Raptor/Wildlife Rescue Center v. County of Stanislaus (1994) 27 Cal.App.4th 713, 721-722. 5365-005acp



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to disclose all potential direct and indirect, significant environmental impacts of a

⁹ See, e.g., Pub. Res. Code § 21100.

¹⁰ Dunn-Edwards v. BAAQMD (1992) 9 Cal.App.4th 644, 652.

¹¹ Communities for a Better Env't v. Cal. Res. Agency (2002) 103 Cal. App.4th 98, 109.

 $^{^{12}}$ 14 Cal. Code Regs. ("CEQA Guidelines"), § 15002, subd. (a)(1).

¹³ See, e.g., Pub. Resources Code § 21100.

¹⁴ Citizens of Goleta Valley v. Board of Supervisors (1990) 52 Cal.3d 553, 564.

project. ¹⁶ In addition, an adequate EIR must contain the facts and analysis necessary to support its conclusions. ¹⁷

The second purpose of CEQA is to require public agencies to avoid or reduce environmental damage when possible by requiring appropriate mitigation measures and through the consideration of environmentally superior alternatives. ¹⁸ The EIR serves to provide agencies and the public with information about the environmental impacts of a proposed project and to "identify ways that environmental damage can be avoided or significantly reduced." To that end, if an EIR identifies significant impacts, it must then propose and evaluate mitigation measures to minimize these impacts. ¹⁹ CEQA imposes an affirmative obligation on agencies to avoid or reduce environmental harm by adopting feasible project alternatives or mitigation measures. ²⁰ Without an adequate analysis and description of feasible mitigation measures, it would be impossible for agencies relying upon the EIR to meet this obligation.

While the courts review an EIR using an "abuse of discretion" standard, "the reviewing court is not to 'uncritically rely on every study or analysis presented by a project proponent in support of its position. A clearly inadequate or unsupported study is entitled to no judicial deference." As the courts have explained, "a prejudicial abuse of discretion" occurs "if the failure to include relevant information precludes informed decision-making and informed public participation, thereby thwarting the statutory goals of the EIR process." 22

F.8 cont.

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¹⁶ Pub. Resources Code § 21100, subd. (b)(1); CEQA Guidelines § 15126.2, subd. (a).

¹⁷ See Citizens of Goleta Valley 52 Cal.3d at 568.

¹⁸ CEQA Guidelines § 15002, subds. (a)(2)-(3); see also, Berkeley Keep Jets Over the Bay Committee v. Board of Port Commissioners (2001) 91 Cal.App.4th 1344, 1354; Citizens of Goleta Valley v. Board of Supervisors (1990) 52 Cal.3d 553, 564; Laurel Heights Improvement Assn. v. Regents of University of California (1988) 47 Cal.3d 376, 391, 400.

¹⁹ Pub. Res. Code §§ 21002.1, subd. (a), 21100, subd. (b)(3).

²⁰ Pub. Res. Code §§ 21002-21002.1.

²¹ Berkeley Jets, 91 Cal. App. 4th 1344, 1355 (emphasis added), quoting, Laurel Heights Improvement Assn. v. Regents of University of California (1988) 47 Cal.3d 376, 391 409, fn. 12.

²² Berkeley Jets, 91 Cal.App.4th at 1355; San Joaquin Raptor/Wildlife Rescue Center v. County of Stanislaus (1994) 27 Cal.App.4th 713, 722; Galante Vineyards v. Monterey Peninsula Water Management Dist. (1997) 60 Cal.App.4th 1109, 1117; County of Amador v. El Dorado County Water Agency (1999) 76 Cal.App.4th 931, 946.
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III. THE DEIR FAILS TO PROVIDE A COMPLETE AND ACCURATE PROJECT DESCRIPTION

The DEIR does not meet CEQA requirements because it fails to include a complete and accurate project description, rendering the entire impact analysis unreliable. An accurate and complete project description is necessary to perform an evaluation of the potential environmental effects of a proposed project. ²³ Without a complete project description, the environmental analysis will be impermissibly narrow, thus minimizing the project's impacts and undercutting public review. ²⁴ The courts have repeatedly held that "an accurate, stable and finite project description is the *sine qua non* of an informative and legally sufficient [CEQA document]." ²⁵ "Only through an accurate view of the project may affected outsiders and public decision makers balance the proposal's benefit against its environmental costs." ²⁶

CEQA Guidelines §15378 defines "project" to mean "the whole of an action, which has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment."²⁷ "The term 'project' refers to the activity which is being approved and which may be subject to several discretionary approvals by governmental agencies. The term project does not mean each separate governmental approval."²⁸ Courts have explained that for a project description to be complete, it must address not only the immediate environmental consequences of going forward with the project, but also all "reasonably foreseeable consequence[s] of the initial project."²⁹

a. The DEIR Fails to Describe the Batteries and Battery Layout

The DEIR includes only brief and general information about the batteries that the Project will use, impeding a comprehensive environmental impact analysis. The main components of a BESS are the batteries. But the DEIR does not describe

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²³ See, e.g., Laurel Heights Improvement Association v. Regents of the University of California (1988) 47 Cal.3d 376.

 $^{^{24}}$ Id.

²⁵ County of Inyo v. County of Los Angeles (1977) 71 Cal.App.3d 185, 193.

 $^{^{26}}$ Id. at 192-193.

^{27 14} CCR § 15378.

²⁸ Id. at § 15378(c).

²⁹ Laurel Heights, 47 Cal.3d at p. 396 (emphasis added); see also Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova (2007) 40 Cal.4th 412, 449-50. 5365-005acp

the specific kind of lithium-ion batteries the Project will use, nor the exact number of batteries or the specific layout in which the batteries will be installed.³⁰

F.9 cont.

Though the DEIR includes some description of the battery banks and enclosures, such as the built-in cooling and fire-suppression systems, it fails to provide any information regarding the actual batteries. The term "lithium-ion batteries" refers to "a broad set of storage technologies," as described by an executive from Tesla who stated that "there are many different sub-chemistries of lithium-ion batteries, each with their own unique characteristics."31 Without a description of the specific kind of lithium-ion batteries to be used, an accurate analysis of the Project's environmental impacts is impossible. As explained by Tesla, "[d]ifferent types of lithium-ion battery systems have different properties and associated risks."32

F.10

Furthermore, the DEIR fails to adequately describe the layout of the batteries or the battery enclosures. The Project Description briefly describes the racks in which the batteries would be mounted, which would "sit side-by-side and typically have 48 inches of spacing in front of the rack and 18 inches of spacing in the rear of the rack."33 No restrictions on how closely the batteries may be placed either to each other or the building walls are provided. Nor does the DEIR state how much wattage may be contained in a single enclosure. Absent this basic information on the battery system layout and other details described above, it is impossible to determine the scope of the BESS's environmental impacts, including, in particular, the fire and explosion risk associated with the Project.

F.11

Particularly concerning is the Project Description's failure to establish a determinate storage capacity for the BESS. While the DEIR states that the BESS would be "capable of storing 40 MW," it also indicates that the storage capacity is "not to exceed 80 MW." 34 Nowhere does the DEIR offer any explanation of this variation, leaving the public to wonder whether the BESS may double in size and capacity over the life of the Project (e.g. perhaps 40 MW is the Project's expected

F.12



³⁰ See DEIR, p. 2-7.

³¹ Letter from Sarah Van Cleve, Manager, US Energy Policy, Tesla, Inc., to Arizona Corporation Commission, Re: Tesla Response to Commissioner Kennedy's August 2nd Letter Regarding Lithium-Ion Battery Safety/Docket No. E-01345A-19-0076, August 19, 2019; available at https://docket.images.azcc.gov/E000002454.pdf.

³² Id.

³³ DEIR, p. 2-7.

³⁴ DEIR, p. 2-7.

⁵³⁶⁵⁻⁰⁰⁵acp

immediate storage capacity while it anticipates the need for 80 MW of storage in the future?). Without explaining the full purpose and objective of the Project and its components, including its foreseeable uses and storage capacity, it is impossible to evaluate the full scope of potential Project impacts. For example, if the BESS is capable of storing 80 MW of energy, its indirect GHG emissions would be double that of a BESS storing just 40 MW of energy.

F.12 cont.

These omitted design details have implications on determining the scope of the Project's impacts, including the fire risk associated with the Project. The DEIR must be revised to include this information so that agency decision-makers and the public have a clear picture of the Project and its associated risks, as required by CEQA.

F.13

b. The DEIR Fails to Describe the Project's Energy Use

The DEIR also lacks key details regarding various other energy-consuming Project components, including ancillary equipment such as the cooling and control systems, the inverters, the ventilation and the HVAC units. Although much of this equipment requires electricity and thus causes GHG and criteria pollutant emissions, the equipment was not described in sufficient detail to allow the public or agency decision-makers to calculate these impacts. The DEIR must be revised to include vendor specifications for the equipment used in the Project, or at the very least provide estimates for the electricity requirements for this equipment.

F.14

Furthermore, the DEIR fails to describe the electricity needed to operate the BESS, the storage efficiency of the BESS, or the expected energy output of the batteries. As explained by SWAPE, these operational details about the BESS, such as how much energy will be available for discharge after the BESS consumes the energy necessary to operate, are "essential to estimate the direct energy and air quality/GHG impacts from operating the BESS." 35

F.15

IV. THE DEIR FAILS TO ACCURATELY DESCRIBE THE EXISTING ENVIRONMENTAL SETTING

A lead agency is required to provide a description of the physical environmental conditions in the vicinity of a project as they exist at the time

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³⁵ SWAPE Comments, p. 10. 5365-005acp

environmental review commences.³⁶ The existing environmental setting is the starting point from which the lead agency must measure whether a proposed project may cause significant environmental impacts.³⁷

Describing the environmental setting accurately and completely for each environmental condition in the vicinity of the Project is critical to a meaningful evaluation of environmental impacts. Courts have held that "[b]efore the impacts of a Project can be assessed and mitigation measures considered, an EIR must describe the existing environment. It is only against this baseline that any significant environmental effects can be determined."³⁸ "[A]n inappropriate baseline may skew the environmental analysis flowing from it, resulting in an EIR that fails to comply with CEQA."³⁹

a. The DEIR Fails to Characterize Potential Soil Contamination

The DEIR fails to include a Phase I Environmental Site Assessment ("ESA") for the Project site. Routinely performed to identify hazardous waste issues or soil contamination that may impact workers, the public, or the environment, a Phase I ESA alerts an agency about the need for further investigation such as soil sampling and cleanup. 40 Such an assessment, explains SWAPE, is necessary for an accurate and complete CEQA analysis related to hazardous materials. 41 As the Project site sits on currently farmed agricultural land, a complete analysis of any hazards or contamination present at the site, such as pesticide-contaminated soil, is imperative to characterize potential contaminants that may be disturbed during Project construction and operation. The absence of such an assessment renders the DEIR's description of the site's existing environmental setting unsupported, and "may skew the environmental analysis flowing from it, resulting in an EIR that fails to comply

F.17

F.16

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See CEQA Guidelines, § 15125(a); see also Communities for A Better Environment v. South Coast Air Quality Management Dist. (2010) 48 Cal.4th 310, 321; see also, 40 C.F.R. § 1502.15; Riverwatch v. County of San Diego (1999) 76 Cal.App.4th 1428, 1453 ("Riverwatch").

³⁷ See, e.g., Communities for a Better Env't v. S. Coast Air Quality Mgmt. Dist. (March 15, 2010) 48 Cal.4th 310, 316; Fat v. County of Sacramento (2002) 97 Cal.App.4th 1270, 1277 ("Fat"), citing Remy, et al., Guide to the Calif. Environmental Quality Act (1999), p. 165.

³⁸ County of Amador v. El Dorado County Water Agency (1999) 76 Cal. App. 4th 931, 952.

³⁹ San Franciscans for Livable Neighborhoods v. City & County of San Francisco ("SFLN") (2018) 26 Cal.App.5th 596, 615 (citations omitted).

⁴⁰ SWAPE Comments, p. 1.

 $^{^{41}}$ Id.

⁵³⁶⁵⁻⁰⁰⁵acp

with CEQA."⁴² The DEIR must be revised and recirculated to include a Phase I ESA, as well as any other necessary soil studies recommended by the Phase I ESA preparer.

F.17 cont.

b. The DEIR's Description of the Existing Environmental Setting for Biological Resources is Inadequate and Incomplete

The DEIR acknowledges that "[c]hanges that would result from the project were evaluated relative to existing environmental conditions within the project site..."⁴³ Without an accurate description of the affected environment, the public cannot determine the extent of the Project's impacts to biological resources, and therefore, cannot determine whether the proposed mitigation measures would effectively reduce significant impacts.

F.18

Dr. Smallwood explains that a meaningful analysis of biological resources, including special-status species, that could be affected by a project should begin with surveys of the site for biological resources and reviews of literature, databases and local experts for documented occurrences of special-status species. ⁴⁴ For its analysis, the DEIR relied on the California Natural Diversity Data Base ("CNDDB") to determine occurrence likelihoods of special-status species of wildlife at the Project site. The Data Base, Dr. Smallwood notes, is not an appropriate resource for the purpose of "rank[ing] species for occurrence likelihood based on CNDDB records within distance thresholds of the site." ⁴⁵ This is because CNDDB relies on voluntary individual reporting of the presence of a species, and is it is not based on scientific sampling. As such, Dr. Smallwood explains CNDDB should not be used for absence determinations. ⁴⁶ The DEIR also includes the results of an on-site reconnaissance survey performed over 17.3 hours on one day, October 22, 2020. The DEIR's efforts to characterize the site's biological resources setting are patently incomplete.

F.19

Dr. Smallwood visited the site himself to get a more accurate picture of the existing setting, not just of the number of species that were expected to be there and did show up, but to collect a more well-rounded perspective of the site as a whole and its surroundings. As Dr. Smallwood explains:

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⁴² San Franciscans for Livable Neighborhoods v. City & County of San Francisco ("SFLN") (2018) 26 Cal.App.5th 596, 615 (citations omitted).

⁴³ DEIR, p. 3.1-1.

⁴⁴ Smallwood Comments, p. 14.

⁴⁵ Smallwood Comments, p. 21.

 $^{^{46}}$ Id.

⁵³⁶⁵⁻⁰⁰⁵acp

> The first step in analysis of potential project impacts to biological resources is to accurately characterize existing environmental conditions, including the species that likely use the site, their relative abundances, how they use the site, key ecological relationships, and known and ongoing threats to those species with special status. A reasonably accurate characterization of the environmental setting can provide the baseline against which to analyze project impacts.⁴⁷

During his site visit, Dr. Smallwood detected 52 species of vertebrate wildlife, including up to 13 special-status species. Between the two survey efforts were 70 species of vertebrate wildlife and 20 documented occurrences of special-status species on the project site. 48 Dr. Smallwood's surveys demonstrate that in the baseline setting information offered by the DEIR is patently incomplete. Dr. Smallwood points out that, based on its review of the CNDDB and one site visit, the DEIR asserted that several special-status species were absent from the site, including the crissal thrasher, Gila woodpecker, gull-billed tern, wester snowy plover, and Yuma Ridgeway's rail. However, Dr. Smallwood, consulting eBird, discovered that all of these species had been recently detected within 1.5 miles of the site, close enough that he would fully expect to see them at the site eventually.⁴⁹ Meanwhile, the yellow warbler, reported as absent from the site by the DEIR, was present on the Project site and photographed by Dr. Smallwood during his site visit.50

Dr. Smallwood's site survey demonstrates that the Project site is replete with wildlife, including several special-status species, and that the DEIR lacks accurate, detailed information about the current biological setting at the Project site. As a result, the DEIR's biological impact analysis remains deficient, and lacks analysis of several special-status species which are either present, or likely to occur, on the Project site. The DEIR must be revised and recirculated to provide accurate baseline information and impact analyses for biological resources. a complete and accurate existing baseline is necessary to determine Project impacts, and a failure to accurately assess the existing setting renders all conclusions regarding impacts to biological resources unreliable.

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F.20 cont.

F.21

⁴⁷ Smallwood Comments, p. 14.

⁴⁸ Smallwood Comments, p. 15.

⁴⁹ Smallwood Comments, p. 20.

⁵⁰ Smallwood Comments, p. 5, Photos 17 and 18.

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⁵³⁶⁵⁻⁰⁰⁵acp

V. THE DEIR LACKS SUBSTANTIAL EVIDENCE TO SUPPORT ITS CONCLUSIONS REGARDING SIGNIFICANT PROJECT IMPACTS AND FAILS TO INCORPORATE ALL FEASIBLE MITIGATION MEASURES

An EIR must fully disclose all potentially significant impacts of a Project and implement all feasible mitigation to reduce those impacts to less than significant levels. The lead agency's significance determination with regard to each impact must be supported by accurate scientific and factual data.⁵² An agency cannot conclude that an impact is less than significant unless it produces rigorous analysis and concrete substantial evidence justifying the finding.⁵³

Moreover, the failure to provide information required by CEQA is a failure to proceed in the manner required by law. ⁵⁴ Challenges to an agency's failure to proceed in the manner required by law, such as the failure to address a subject required to be covered in an EIR or to disclose information about a project's environmental effects or alternatives, are subject to a less deferential standard than challenges to an agency's factual conclusions. ⁵⁵ In reviewing challenges to an agency's approval of an EIR based on a lack of substantial evidence, the court will "determine de novo whether the agency has employed the correct procedures, scrupulously enforcing all legislatively mandated CEQA requirements...." ⁵⁶

Even when the substantial evidence standard is applicable to agency decisions to certify an EIR and approve a project, reviewing courts will not "uncritically rely on every study or analysis presented by a project proponent in support of its position. A clearly inadequate or unsupported study is entitled to no judicial deference." ⁵⁷

Here, the DEIR failed to adequately analyze and mitigate the Project's potentially significant impacts to air quality, GHG emissions and energy, agricultural resources, soil, water, biological resources and land use, and failed to

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⁵² 14 CCR § 15064(b).

⁵⁸ Kings Cty. Farm Bur. v. Hanford (1990) 221 Cal. App. 3d 692, 732.

 $^{^{54}}$ Sierra Club v. State Bd. Of Forestry (1994) 7 Cal.4th 1215, 1236.

 $^{^{55}}$ Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova (2007) 40 Cal.4th 412, 435.

⁵⁶ Id.

⁵⁷ Berkeley Keep Jets Over the Bay v. Bd. of Port Comm'rs. (2001) 91 Cal. App. 4th 1344, 1355 ("Berkeley Jets"). 5365-005aco

adequately analyze the cumulatively considerable impacts of the Project when considered with nearby projects of a similar nature. Finally, the DEIR cannot support with substantial evidence its conclusions regarding mitigation of significant Project impacts to less-than-significant levels.

F.23 cont.

F.24

a. The DEIR's Reported Impacts to Air Quality from Construction Emissions are Underestimated and Unmitigated

The DEIR's analysis of construction air quality impacts is inaccurate and unsupported. As explained by SWAPE, several values input into the DEIR's emissions calculation model were incorrect or inconsistent with information found in the DEIR, resulting in underestimated construction and operation emissions.⁵⁸ Material silt content, for example, is factored into an evaluation of dust emissions associated with construction activity such as bulldozing.⁵⁹ Rather than estimating dust emissions using the default material silt content value of 8.5% provided by the CalEEMod User's Guide, the DEIR assumed a much lower material silt content of 3%, without supporting evidence. 60 The DEIR attempts to explain the change by stating that "[t]he Material Silt Content was changed to 3 percent in order to account for ICAPCD Rule 805 F.1.c that requires the installation of gravel or other low silt material with less than 5 percent silt content on all onsite roads."61 However, a review of ICAPCD Rule 805 F.1.c demonstrates that its enumerated requirements apply to the installation of gravel or silt material on unpayed roads to control dust, not to dust emissions generated by disturbing soil during off-road construction-related activities .62 SWAPE explains that the material silt content values factored into the DEIR's CalEEMod dust emission estimates should have reflected the silt content of the material to be bulldozed, not material that would be installed during road construction. The DEIR's use of an artificially lower silt content value results in considerably underestimated dust emissions impacts.

Furthermore, the DEIR's estimations of fugitive dust emissions from on-road vehicles replaced the model's default values with values that would lead to unsupported lower fugitive dust emissions. For example, the DEIR replaced the default percentage of paved roads and trips taken on paved roads, estimated by

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⁵⁸ SWAPE Comments, p. 2.

 $^{^{59}}$ Id.

 $^{^{60}}$ DEIR Appendix A, pdf pp. 636, 658; Appendix C, pdf p. 683.

⁶¹ DEIR, p. 3.4-15.

⁶² ICAPCD Rule 805 F.1.c.

CalEEMod to be 50%, with higher values of 85% and 99%.63 No evidence substantiating these significant changes is provided, however, other than the explanation that the percent of "on-road pavement was changed to 85 percent to account for Best Avenue that is adjacent to the project site."64 No further support is provided, precluding any meaningful evaluation of the DEIR's dust emissions estimates. SWAPE explains that "by including unsubstantiated changes to the default percent paved values for the Project's construction-related and operational trips, the Project's construction-related and operational emissions may be underestimated, and the models should not be relied upon to determine Project significance."65

F.25 cont.

b. The DEIR Fails to Adequately Identify, Analyze, and Mitigate the Project's Impacts from Energy Use

CEQA requires agencies to analyze a project's energy impacts when "the project's energy use reveals that the project may result in significant environmental effects due to the wasteful, inefficient, or unnecessary consumption use [sic] of energy..."66 The CEQA Guidelines also state that the analysis of a project's energy impacts "should include the project's energy use for all project phases and components," and that relevant considerations include "the project's size, location, orientation, equipment use and any renewable energy features that could be incorporated into the project."67 Further guidance for considering energy impacts is included in Appendix F of the Guidelines, which states that the energy analysis may include "[t]he effects of the project on peak and base period demands for electricity and other forms of energy," as well as the "the effects of the project on energy resources."68

F.26

Recent cases interpreting Appendix F hold that, to comply with CEQA, the lead agency must not only describe a project's energy impacts, it must also quantify them.⁶⁹ Further guidance for considering energy impacts states that the energy

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 $^{^{63}}$ DEIR Appendix A, pdf p. 658.

⁶⁴ DEIR, p. 3.4-15.

⁶⁵ SWAPE Comments, p. 5.

^{66 14} CCR § 15126.2(b).

⁶⁷ Id.

⁶⁸ CEQA Guidelines, Appendix F: Energy Conservation, Section C(3); Section C(5).

⁶⁹ Ukiah Citizens for Safety First v. City of Ukiah ("Ukiah Citizens") (2016) 248 Cal. App. 4th 256, 264-65 (energy impact analysis requires clarification and technical information regarding project-related energy usage and conservation features); Spring Valley Lake Association v. City of Victorville 5365-005acn

analysis may include "[t]he effects of the project on peak and base period demands for electricity and other forms of energy," as well as the "the effects of the project on energy resources." The CEQA Guidelines also state that the energy analysis "may be included in related analyses," such as the GHG impact analysis. The CEQA Guidelines also state that the energy analysis "may be included in related analyses," such as the GHG impact analysis.

F.26 cont.

The DEIR's analysis of Project energy usage fails to account for several sources of on-site energy consumption, including ancillary equipment such as HVAC, cooling, and control systems, ventilators, inverters, and transformers. Though the DEIR acknowledges that energy will be required to keep all these Project components operational, it The DEIR includes in its energy usage calculations only "the air conditioning units and power conversion associated with the proposed BESS," which, according to BESS system specifications, will not use more than 2 percent of the electricity stored.⁷² In addition, the DEIR fails to consider the amount of generation that is required to operate the BESS, known as "round-trip efficiency." Round-trip efficiency, SWAPE explains, is the "battery system efficiency over one cycle, measured as the amount of energy discharged to a specified depth over the amount of energy consumed to bring the system back up to its specified initial state of charge."78 Failure to consider this battery system efficiency in calculations of energy usage results in underestimated impacts from energy use, as well as impacts from the emissions of GHGs that are a direct result of that use.

F.27

Moreover, studies have shown that energy storage has actually increased energy use in the United States due to "energy arbitrage," the practice of storing energy when cheapest and discharging energy when most expensive, without regard

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^{(&}quot;Spring Valley") (2016) 248 Cal.App.4th 91, 103 (EIR must show factual basis of its assumptions that both energy use and greenhouse gas emissions will be reduced); California Clean Energy Committee v. City of Woodland ("CCEC") (2014) 225 Cal.App.4th 173, 210 ("CEQA EIR requirements are not satisfied by saying an environmental impact is something less than some previously unknown amount"). This is consistent with longstanding precedent which holds that unsupported conclusions are entitled to no judicial deference. Comtys. for a Better Env't v. City of Richmond ("CBE v. Richmond") (2010) 184 Cal.App.4th 70, 85; Topanga, 11 Cal.3d at 515 (EIR must provide reader with analytic bridge between ultimate findings and the facts in the record).

⁷⁰ CEQA Guidelines, Appendix F: Energy Conservation, Section C(3); Section C(5).

^{71 14} CCR § 15126.2(b).

⁷² DEIR, Appendix C, p. 41.

⁷⁸ SWAPE Comments, p. 10 fn.14. 5365-005acp

to the electricity source that charges the battery.⁷⁴ SWAPE explains that because storing energy increases the value of the energy sources it draws from and, when discharged, decreases the value of the energy sources it competes against, the BESS, if charged at night with energy from the grid rather than during the day from the solar facility, actually promotes the use of non-renewable energy and GHG emissions.⁷⁵ The DEIR fails to account for this increase in energy use resulting from the Project's storage activity.

F.28 cont.

The DEIR fails as an informational document and is deficient as a matter of law because it fails to disclose or quantify the energy impacts of the Project, fails to include any conditions restricting battery charging to use of renewable energy, and fails to describe potential energy mitigation measures, as required by CEQA.⁷⁶

F.29

c. The DEIR Fails to Adequately Analyze and Mitigate Impacts to Air Quality Resulting from GHG Emissions

The CEQA Guidelines state that lead agencies "shall make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gases resulting from a project."⁷⁷ "The agency's analysis also must reasonably reflect evolving scientific knowledge and state regulatory schemes."⁷⁸ The Guidelines also state that the lead agency "may use a model or methodology to estimate greenhouse gas emissions resulting from a project … The lead agency must support its selection of a model or methodology with substantial evidence. The lead agency should explain the limitations of the particular model or methodology used."⁷⁹

F.30

The DEIR fails to evaluate indirect GHG emissions associated with the BESS. The DEIR does not specifically commit to charging the BESS only with energy generated by the solar facility, indicating it will likely be charged with energy from the grid, which does not contain a 100% renewable energy mix, when

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⁷⁴ SWAPE Comments, p. 11; Eric S. Hittinger and Ines M.L. Azevedo, *Bulk Energy Storage Increase United States Electricity System Emissions*, J. OF ENV. SCI. TECH. (2015) available at https://doi.org/10.1021/es505027p.

⁷⁵ SWAPE Comments, p. 11.

⁷⁶ People v. County of Kern (1976) 62 Cal.App.3d 761, 774–775.

^{77 14} CCR § 15064.4(a).

 $^{^{78}}$ *Id*.

⁷⁹ Id. at § 15064.4(c).

⁵³⁶⁵⁻⁰⁰⁵acp

the solar facility is not generating power.⁸⁰ As SWAPE explains, renewable energy constituted 33.09% of California's total energy mix in 2020.81 "As such, unless the developer commits to only charge the BESS with generation from the adjoining solar power plant, the proposed Project would increase GHG emissions."82

F.31 cont.

d. The DEIR Failed to Analyze Health Risks from Exposure to **Project Emissions**

The DEIR lacks an analysis of the health risk caused by exposure to toxic air contaminants ("TACs") during Project construction, in violation of CEQA. Courts have held that an environmental review document must disclose a project's potential health risks to a degree of specificity that would allow the public to make the correlation between the project's impacts and adverse effects to human health.83

In Sierra Club v. County of Fresno, the California Supreme Court affirmed CEQA's mandate to protect public health and safety by holding that an EIR fails as an informational document when it fails to disclose the public health impacts from air pollutants that would be generated by a development project.⁸⁴ The Court concluded that the County's EIR failed to comply with CEQA because the public, after reading the EIR, "would have no idea of the health consequences that result when more pollutants are added to a nonattainment basin."85 CEQA mandates discussion, supported by substantial evidence, of the nature and magnitude of impacts of air pollution on public health.86

F.32

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⁸⁰ SWAPE Comments, p. 11.

^{81 2020} Total System Electric Generation, California Energy Commission, available at: https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/2020-total-systemelectric-generation (last visited 2/6/2022).

⁸² SWAPE Comments, p. 11.

⁸³ Bakersfield Citizens for Local Control v. City of Bakersfield (2004) 124 Cal. App. 4th 1184.

⁸⁴ Sierra Club, 6 Cal.5th at 518-522.

 $^{^{85}}$ Id. at 518. CEQA's statutory scheme and legislative intent also include an express mandate that agencies analyze human health impacts and determine whether the "environmental effects of a project will cause substantial adverse effects on human beings, either directly or indirectly." (Public Resources Code § 21083(b)(3) (emphasis added).) Moreover, CEQA directs agencies to "take immediate steps to identify any critical thresholds for the health and safety of the people of the state and take all coordinated actions necessary to prevent such thresholds being reached." (Public Resources Code § 21000(d) (emphasis added).) ⁸⁶ Sierra Club, 6 Cal.5th at 518–522. 5365-005acp

In *Berkeley Jets*, the Court of Appeal held that an EIR must analyze the impacts from human exposure to toxic substances.⁸⁷ In that case, the Port of Oakland approved a development plan for the Oakland International Airport.⁸⁸ The EIR admitted that the project would result in an increase in the release of TACs and adopted mitigation measures to reduce TAC emissions, but failed to quantify the severity of the project's impacts on human health.⁸⁹ The Court held that mitigation alone was insufficient, and that the Port had a duty to analyze the health risks associated with exposure to TACs.⁹⁰ As the CEQA Guidelines explain, "[t]he EIR serves not only to protect the environment but also to demonstrate to the public that it is being protected."⁹¹

F.32 cont.

The Office of Environmental Health Hazard Assessment's ("OEHHA") risk assessment guidelines recommend a formal health risk analysis ("HRA") for short-term construction exposures lasting longer than 2 months. 92 The ICAPCD CEQA Guidelines indicate that a health risk analysis may be required for any development project that is located within close proximity to sensitive receptors and where the proposed project has the potential to emit toxic or hazardous pollutant, even at very low levels. 93

The nearest sensitive receptors to the project site include the following:

- Single-family homes approximately 40 feet to the north side of the project site, located near the northwest corner of the project site.
- Single-family residence on the east side of N Best Avenue, located near the northeast corner of the project site.
- Single-family residence on the east side of N Best Avenue, located across the proposed project's primary access road.
- Two single-family residences located at the northeast corner of the intersection of N Best Avenue and Ward Road.

⁹³ ICAPCD CEQA Air Quality Handbook, p. 15.



F.33

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⁸⁷ Berkeley Jets, 91 Cal. App. 4th at 1369-1371.

⁸⁸ Id. at 1349–1350.

⁸⁹ *Id*. at 1364–1371.

⁹⁰ *Id*.

^{91 14} C.C.R. § 15003(b).

⁹² Office of Environmental Health Hazard Assessment (OEHHA), Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments, February 2015 (OEHHA 2015), Section 8.2.10: Cancer Risk Evaluation of Short Term Projects, pp. 8-17/18; https://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-

nttps://oema.ca.gov/ar/crn/mouce-adoption-air-toxics-not-spots-program-guidance-manual preparation-health-risk-0.

• Single-family residence (with a horse boarding/training facility) on the west side of N Best Avenue, located south of the project site.

Project construction is expected to last 6 to 9 months, during which time construction activity would produce diesel particulate matter ("DPM") emissions through the exhaust stacks of construction equipment. Project operations, meanwhile, would result in an estimated average of 160 trips per year and "would generate additional exhaust emissions and continue to expose nearby sensitive receptors to DPM emissions during Project operation."⁹⁴

The DEIR, however, fails to evaluate Project-generated TACs or indicate the concentrations at which such pollutants would trigger adverse health effects. Despite acknowledging that "the greatest potential for toxic air contaminant emissions would be related to diesel particulate matter (DPM) emissions associated with heavy equipment operations during construction," the DEIR concludes, without substantive analysis:

Given the relatively limited number of heavy-duty construction equipment, the varying distances that construction equipment would operate to the nearby sensitive receptors, and the short-term construction schedule, the proposed project would not result in a long-term (i.e., 30 or 70 years) substantial source of toxic air contaminant emissions and corresponding individual cancer risk.⁹⁵

This rationale ignores CEQA's directives for a detailed health risk analysis and OEHHA's recommendation that a lower cancer risk threshold be considered for very short-term projects: "There is valid scientific concern that the rate of exposure may influence the risk – in other words, a higher exposure to a carcinogen over a short period of time may be a greater risk than the same total exposure spread over a much longer time period." As explained by SWAPE, "without making a reasonable effort to connect the Project's construction-related and operational TAC emissions to the potential health risks posed to nearby receptors, the DEIR is inconsistent with CEQA's requirement to correlate the increase in emissions generated by the Project with the potential adverse impacts on human health." 97



F.33 cont.

⁹⁴ SWAPE Comments, p. 7.

⁹⁵ DEIR, p. 3.4-21.

⁹⁶ OEHHA Air Toxics Hot Spots Program Guidance Manual, p. 8-18.

 $^{^{97}}$ SWAPE Comments, p. 7.

⁵³⁶⁵⁻⁰⁰⁵acp

e. The DEIR Fails to Adequately Analyze and Mitigate Significant Project Impacts to Agricultural Resources

California has long acknowledged that preservation of its agricultural resources is of utmost importance to the state. As statewide urban populations grow and development pressure increases, conserving land that contributes to the state, national, and world food supply is necessary to safeguard this crucial land use. 98 Imperial County, location of some of the world's most productive farmland, recognizes the necessity of its preservation:

Agriculture has been the single most important economic activity in the County throughout its history. The County recognizes the area as one of the finest agricultural areas in the world because of several environmental and cultural factors including good soils, a year-round growing season, the availability of adequate water transported from the Colorado River, extensive areas committed to agricultural production, a gently sloping topography, and a climate that is well-suited for growing crops and raising livestock.⁹⁹

The Agricultural Element of the General Plan considers all farmland in the County to be Important Farmland, defined as Prime Farmland, Unique Farmland, Farmland of Statewide Importance, and Farmland of Local Importance, which the General Plan asserts should be reserved for agricultural uses. ¹⁰⁰ The Agricultural Element authorizes the conversion of agricultural land to nonagricultural uses "only where a clear and immediate need can be demonstrated." ¹⁰¹ Implementation of this policy is achieved by the directive of Program 1:

No agricultural land designated except as provided in Exhibit C shall be removed from the Agriculture category except where needed for use by a public agency, for renewable energy purposes, where a mapping error may have occurred, or where a clear long term economic benefit to the County can be demonstrated through the planning and environmental review process. The Board (or Planning Commission) shall be required to prepare and make specific findings and circulate same for 60 days (30

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 $^{^{98}}$ See California Farmland Conservancy Program Act, Pub. Resources Code §§ 10200 et seq. 99 DEIR, p. 3.3-5.

 $^{^{100}}$ 2015 Imperial County General Plan, Agricultural Element, Policy 1: Preservation of Important Farmland, p. 39. $^{101}\,Id.$

days for parcels considered under Exhibit C of this element) before granting final approval of any proposal which removes land from the Agriculture category. 102

F.34 cont.

The Project site consists of 205 acres of Farmland of Statewide Importance, 12 acres of Farmland of Local Importance, 4.4 acres of Prime Farmland, and 1 acre of Unique Farmland, all of which is currently cultivated, and all of which the Project will remove from the County's inventory of important farmland for nonagricultural uses. 108

F.35

i. The DEIR's Determination of the Significance of Project Impacts to Agricultural Resources is Founded on a Misrepresentation of the Impacts as 'Temporary'

CEQA Guidelines Appendix G provides a checklist that agencies can use in assessing the significance of an impact. To evaluate impacts on agricultural resources, Appendix G suggests an agency consider whether the Project would:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.
- Conflict with existing zoning for agricultural use, or a Williamson Act contract.

F.36

 Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to nonagricultural use.¹⁰⁴

Applying Appendix G's criteria as thresholds of significance, the DEIR determined that the Project would result in significant impacts to agricultural resources, requiring the implementation of Mitigation Measures AG-1a, AG-1b, and AG-2. Its flawed analysis of Project impacts, however, produces a distorted

¹⁰⁴ CEQA Guidelines, Appendix G, Evaluation of Environmental Impacts, § II. Agriculture and Forestry Resources.
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 $^{^{102}} Id.$

¹⁰⁸ DEIR, p. 3.3-1.

perception of their significance and an inaccurate understanding of the measures necessary to mitigate them.

The DEIR indicates that electricity generated at the solar facility is anticipated to be sold under the terms of a power purchase agreement ("PPA") to a utility service provider. The Project as proposed, however, does not yet have any such agreement in place. Despite this uncertainty, the DEIR insists that when the Project is decommissioned at the end of its life, a reclamation plan will be carried out that will include "restoration of the site to its pre-project condition." No reclamation plan has yet been prepared, and no binding restoration measures have been proposed. The DEIR's Project Description includes a cursory list of suggested site restoration actions, none of which contemplate the restoration of any farmland, let alone the restoration of the site's specific soil makeup to its current condition.

F.36 cont.

The DEIR relies on the "temporary" nature of the Project and the site's eventual return to agricultural uses as mitigation for the adverse impact on agricultural resources. However, the DEIR acknowledges that there is no guarantee the land will be returned to agricultural uses: "If at the end of the PPA term, no contract extension is available for a power purchaser, no other buyer of the energy emerges, or there is no further funding of the project, the project will be decommissioned and dismantled." ¹⁰⁷ As Mr. House puts it, the Project cannot be considered temporary unless a specific end-date is given. ¹⁰⁸ Otherwise, the Project can continue its nonagricultural operations on the Project site indefinitely, rendering the proposed mitigation unenforceable and meaningless.

ii. The DEIR Fails to Identify, Analyze, and Mitigate the Project's Potentially Significant Impacts to Soil Quality

Despite the DEIR's insistence that the site will be "returned to its current agricultural condition" at the end of the Project's life, nowhere does the DEIR offer its understanding of what that current condition is. An accurate reclamation plan must, necessarily, first establish the conditions it will try to reclaim. Furthermore, pursuant to CEQA, a description of the physical environmental conditions in the

F.37

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¹⁰⁵ DEIR, p. 2-13.

¹⁰⁶ DEIR, pp. 3.3-6-7.

 $^{^{107}}$ DEIR, p. 3.11-16 (emphasis added).

¹⁰⁸ House Comments, p. 2.

vicinity of the Project is required for all EIRs, and normally serves as the baseline setting against which a lead agency determines whether an impact is significant.¹⁰⁹ Despite describing the existing environmental setting associated with several other areas of concern, and despite proposing a mitigation measure and condition of approval committed to returning the site to its current condition, the DEIR fails to evaluate the site's existing setting.

In order to adequately gauge the sufficiency of restoration efforts, a quantitative assessment of soil quality, Mr. House asserts, should regularly monitor and record the "overall site characterization, the soil's respiration, rate of water infiltration, bulk density, electrical conductivity (a measure of salinification), soil pH and nitrate level, aggregate stability, slake test, earthworm test, depth of topsoil, and plant-rooting depth."110 Evaluation of the soil quality should take place throughout the life of the Project, Mr. House explains, as he expects significant soil degradation, including salinification, compaction, and loss of organic matter, is likely to occur over the anticipated 25 to 30 years (minimum) the Project will occupy the site. 111

Salinification, Mr. House indicates, is of particular concern because of a significant shift in the amount of water that will be applied to the site once it is taken out of agricultural production. The Project, which will use untreated Colorado River water¹¹² to periodically wash the solar PV panels for routine maintenance, will require considerably less water during operations than the current agricultural use, which may increase soil salinity:

Small amounts of water, such as the runoff from washing of the PV panels, will be insufficient to leach the applied salts below the root zone in the soil profile. Increasing soil salinity can be prevented by applying more water to the field than can be retained in the root zone of crops, forcing leaching to occur. The water percolates downward, carrying the salts, thereby preventing excessive accumulation and future salinity issues.113



F.37 cont.

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^{109 14} CCR § 15125(a).

¹¹⁰ House Comments, p. 3.

 $^{^{112}}$ Mr. House points out that Colorado River water has a noted salinity issue that has prompted the implementation of state and federal salinity control projects.

¹¹³ House Comments, p. 3. 5365-005acp

The DEIR offers no analysis of this long-term soil impact, which remains potentially significant and unmitigated. Rather, these impacts are alluded to in the DEIR's analysis of hydrology and water quality, without declaring them significant agricultural impacts or requiring any mitigation. In the process of asserting that the Project will not result in any impacts to groundwater, the DEIR, perhaps unwittingly, confirms Mr. House's concern that runoff from panel washing that does not evaporate would "percolate through the ground, as a majority of the surfaces in the solar field would remain pervious." 114

F.37 cont.

In omitting any analysis of this impact, the DEIR fails as an informational document and must be revised to conduct a full and thorough analysis of all potentially significant impacts, and mitigation to reduce impacts to less than significant levels.

iii. The DEIR's Mitigation of Significant Impacts to Agricultural Resources Fail to Satisfy the Requirements of CEQA

One of the principles most central to the purpose of CEQA is the directive that an agency identify ways in which a project's significant environmental impacts can be mitigated to less than significant levels. ¹¹⁵ To this end, a lead agency must include in the discussion of a project mitigation measures that are feasible, practical, and effective. ¹¹⁶ Feasible mitigation measures are those capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors. ¹¹⁷

F.38

A public agency may not rely on mitigation measures of uncertain efficacy or feasibility.¹¹⁸ Mitigation measures must be fully enforceable through permit conditions, agreements or other legally binding instruments.¹¹⁹ Lead agencies should avoid vague, incomplete, or untested mitigation measures, and must not consider measures that are remote and speculative.¹²⁰ Mitigation measures that are

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¹¹⁴ DEIR, p. 3.10-15.

 $^{^{115}}$ Pub. Resources Code §§ 21002.1(a), 21061.

¹¹⁶ Napa Citizens for Honest Gov. v. Bd. Of Supervisors (2001) 91 Cal.App.4th 342, 365.

 $^{^{117}}$ CEQA Guidelines, § 15364.

¹¹⁸ E.g. Kings County Farm Bureau v. City of Hanford (1990) 221 Cal.App.3d 692, 727 (finding groundwater purchase agreement inadequate mitigation measure because no record evidence existed that replacement water was available).

¹¹⁹ CEQA Guidelines, § 15126.4(a)(2).

¹²⁰ Fed. of Hillside & Canyon Ass'ns v. City of Los Angeles (2000) 83 Cal.App.4th 1252,1260.
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so undefined that it is impossible to gauge their effectiveness may be found inadequate. 121 Finally, mitigation generally must not be impermissibly deferred to some unknown future date. 122

cont.

F.39

MM AG-1a, Payment of Agricultural and Other Benefit Fees, consists of three options intended to offset the Project's impacts from the conversion of important farmland. The list includes the acquisition of agricultural conservation easements on land of equal size and quality, the payment of in-lieu mitigation fees to be used "for such purposes as the acquisition, stewardship, preservation and enhancement of agricultural lands within Imperial County," or adoption of a Development Agreement that includes an Agricultural Benefit Fee. 123 The mitigation measure includes options designed to mitigate impacts to both Prime and non-Prime Farmland, plus a fourth option for mitigation of impacts to Prime Farmland which requires the Permittee to revise the CUP application and Site Plan to avoid Prime Farmland. 124

MM AG-1b's Site Reclamation Plan, to be submitted to the County ahead of issuance of a grading permit, "shall document the procedures by which the project site will be returned to its current agricultural condition. Permittee shall also provide financial assurance/bonding in the amount equal to a cost estimate prepared by a California-licensed general contractor or civil engineer for implementation of the Reclamation Plan in the event Permittee fails to perform the Reclamation Plan."125

The mitigation measures proposed to reduce Project impacts to Agricultural Resources are either legally inadequate or insufficient, or both, as explained more fully below. Furthermore, the efficacy of the proposed measures is not apparent, and the DEIR lacks any evidence demonstrating that they could reduce Project impacts.¹²⁶ For the following reasons, the DEIR must be revised to include a sufficient discussion of adequate mitigation measures.

¹²⁶ Sierra Club v. County of San Diego (2014) 231 Cal.App.4th 1152, 1168.



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¹²¹ Preserve Wild Santee v. City of Santee (2012) 210 Cal. App. 4th 260, 281.

^{122 14} CCR § 15126.4(a)(1)(B).

¹²³ DEIR, pp. 3.3-10-11.

 $^{^{124}} Id.$

 $^{^{125}}$ Id.

1. <u>Project Mitigation is Overly Vague, Remote, Speculative</u> and of Uncertain Efficacy

A lead agency is precluded from making the required CEQA findings to approve a project unless the record shows that all uncertainties regarding the mitigation of impacts have been resolved. For this reason, an agency may not rely on mitigation measures of uncertain efficacy or feasibility. ¹²⁷ This approach helps "ensure the integrity of the process of decision by precluding stubborn problems or serious criticism from being swept under the rug." ¹²⁸

Mitigation measures AG-1a (discussed below) and AG-1b are both characterized by vague, indeterminate terms and remote possibilities that they might mitigate Project impacts, with no way to gauge their efficacy. AG-1b, requiring a Site Reclamation Plan if the Project is ever decommissioned, is founded entirely on the DEIR's claim that the Project is "temporary." However, no other requirement exists anywhere in the Project, its conditions of approval, or its mitigation measures that would legally bind a permittee to the requirement to decommission the Project at some future point. As no PPA has yet been formed, there are no terms in place and no end date for the life of the Project. Any future use of the Project site is uncertain, as indicated in the DEIR's Project Description: "At the end of the PPA term, the owner of the facility may choose to enter into a subsequent PPA, update technology and re-commission, or decommission and remove the generating facility and its components." Nonagricultural uses of the site may continue indefinitely, and therefore impacts to Agricultural Resources may never even get the opportunity to be mitigated.

2. The Project Impermissibly Defers Mitigation

Deferral of the formulation of mitigation measures is generally improper under CEQA. ¹³⁰ An exception to this general rule applies when the agency has committed itself to specific performance criteria for evaluating the efficacy of the measures to be implemented in the future, and the future mitigation measures are

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 $^{^{127}}$ Kings County Farm Bureau v. County of Hanford (1990) 221 Cal.App.3d 692, 727-28 (a groundwater purchase agreement found to be inadequate mitigation because there was no record evidence that replacement water was available).

 ¹²⁸ Concerned Citizens of Costa Mesa, Inc. v. 32nd Dist. Agricultural Assn. (1986) 42 Cal.3d 929, 935.
 129 DEIR, p. 2-13.

¹⁸⁰ 14 CCR § 15126.4(a)(1)(B); POET v. CARB (2013) 218 Cal.App.4th 681, 735.

formulated and operational before the project activity that they regulate begins.¹³¹ As the courts have explained, deferral of mitigation may be permitted only where the lead agency (1) undertakes a complete analysis of the significance of the environmental impact; (2) proposes potential mitigation measures early in the planning process; and (3) articulates specific performance criteria that would ensure that adequate mitigation measures were eventually implemented.¹³²

Here, because the Project does not yet have a PPA in place, a reclamation plan that will bind the future permittee to abide by its terms for site restoration, should they ever decide to decommission the Project, has not yet been formulated. Discussions of site reclamation in the DEIR outline typical measures undertaken during site restoration. However, the DEIR contains no specific performance criteria which would require the implementation of adequate mitigation.

For example, mitigation measure AG-1b declares that the site will be "returned to its current agricultural condition," but it fails to offer any specific criteria by which the site's "current condition" is measured, nor does it indicate how restoration to such a vague standard might be accomplished. Furthermore, the DEIR observes that each category of important farmland can be distinguished by specific attributes, such as soil quality. Despite the claim that the site will be restored to its "current condition," the DEIR also acknowledges that the Project may irreversibly alter the site's chemical or soil makeup and that "[a]ny reductions in agricultural productivity could significantly limit the types of crops (e.g., deeper rooting crops, orchards, etc.) that may be grown within the project site in the future. In fact, the DEIR's Project Description concedes that the site may not even be restored to a condition compatible with agricultural uses: "Upon decommissioning, the site could be converted to other uses in accordance with

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¹⁸¹ POET, LLC v. State Air Resources Bd. (2013) 218 Cal.App.4th 681, 738.

 $^{^{132}}$ Comtys. for a Better Env't v. City of Richmond (2010) 184 Cal. App.4th 70, 95; Cal. Native Plant Socy' v. City of Rancho Cordova (2009) 172 Cal. App.4th 603, 621.

¹³³ ĎEIR, p. 2-13.

¹³⁴ DEIR, p. 3.3-11.

¹³⁵ Prime Farmland has the best combination of physical and chemical features able to sustain long-term agricultural production. Farmland of Statewide Importance is similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Unique Farmland consists of lesser quality soils used for the production of the state's leading agricultural crops. Farmland of Local Importance is land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee. DEIR, pp. 3.3-3-4. ¹³⁶ DEIR, p. 3.3-13. ^{5365-005aco}

applicable land use regulations in effect at that time."¹³⁷ The mitigation measure commits the County and Applicant only to a goal—site restoration—and not specific performance criteria. The measure, therefore, violates CEQA's general rule prohibiting deferred formulation.

F.41 cont

3. Payment of Agricultural and Other Benefit Fees are Inadequate

Mitigation fees are not adequate mitigation unless the lead agency can show that the fees will fund a specific mitigation plan that will actually be implemented in its entirety. B Mitigation measure AG-1a offers three options from which to choose, ranging from acquisition of agricultural conservation easements to payment of agricultural in-lieu mitigation fees to adoption of a Public Benefit or Development Agreement. Benefit or Development Agreement.

Option 1's conservation easements call for "land of equal size, of equal quality farmland, outside the path of development." ¹⁴⁰ As Mr. House explains, conserving land at some other location of the County "outside the path of foreseeable development would fail to mitigate like for like." ¹⁴¹ A better solution, and one that has actually shown to be effective, he noted, would be to follow the example of the City of Davis, which developed a policy requiring that a conservation easement be "placed on another nearby agricultural property of similar size, important-farmland standing, and threat status with respect to future path of development for the duration of a solar installation." ¹⁴²

Option 2 contemplates mitigation of impacts to both Prime and non-Prime Farmland by proposing the payment of agricultural in-lieu mitigation fees in the amount of 20 percent—30 percent for Prime Farmland—of the fair market value per acre for the total acres of the site. 143 The fee would be placed in a trust account



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¹³⁷ DEIR, p. 2-13.

 $^{^{138}}$ See Napa Citizens for Honest Gov. v. Bd. Of Supervisors (2001) 91 Cal. App.4th 342 (no evidence that impacts will be mitigated simply by paying a fee); Anderson First Coal. v. City of Anderson (2005) 130 Cal. App.4th 1173 (traffic mitigation fee is inadequate because it does not ensure that mitigation measure will actually be implemented); Kings Co. Farm Bureau v. Hanford (1990) 221 Cal. App.3d 692.

¹³⁹ DEIR, pp. 3.3-10-11.

 $^{^{140}\,}Id.$

¹⁴¹ House Comments, p. 6.

¹⁴² House Comments, p. 6.

¹⁴³ DEIR, p. 3.3-10.

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administered by the Imperial County Agricultural Commissioner's office and "will be used for such purposes as the acquisition, stewardship, preservation and enhancement of agricultural lands within Imperial County." ¹⁴⁴ No specific plan or program is enumerated as the intended recipient of mitigation fees, and no further evaluation of the efficacy of this mitigation measure is provided. It is clear from well-settled case law that merely paying a fee, without a link to a specific plan or program, does not amount to adequate mitigation.

Similarly, the adoption of a Public Benefit or Development Agreement vaguely described in Option 3 offers no discussion of how it might contribute to the mitigation of the Project at hand, nor does it provide detail relating to the Project, other than the explanation that such an agreement would include a fee to be used "only for such purposes as the stewardship, preservation and enhancement of agricultural lands within Imperial County and to implement the goals and objectives of the Agricultural Benefit program, as specified in the Development Agreement, including addressing the mitigation of agricultural job loss on the local economy." 145

F.42 cont.

An additional measure to reduce impacts to Prime Farmland, Option 4, simply states: "The Permittee must revise their CUP Application/Site Plan to avoid Prime Farmland." 146

Each of the mitigation measures discussed above fails to comply with CEQA: they are vague, unenforceable, indefinite, and impermissibly deferred. As such, impacts to Agricultural Resources resulting from the Project remain significant and unmitigated. The DEIR must be revised to include a more robust discussion of mitigation measures that have been evaluated for their efficacy and ability to reduce the Project's significant impacts.

f. The DEIR Fails to Adequately Analyze and Mitigate Project Inconsistencies with Local and Regional Land Use Plans

CEQA requires the inclusion in an EIR a discussion of "any inconsistencies between the proposed project and applicable general plans, specific plans, and

F.43



 $^{^{144}} Id.$

¹⁴⁵ DEIR, pp. 3.3-10-11.

 $^{^{146}} Id.$

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regional plans."¹⁴⁷ The Project is inconsistent with several of the policies and objectives found in local and regional plans, including Imperial County's General Plan and Southern California Association of Governments' 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy ("RTP/SCS") (Connect SoCal). These inconsistencies demonstrate the existence of significant and unmitigated Project impacts. In addition, the existence of significant

F.43 cont

i. The Project Conflicts with Policies and Goals of the County General Plan and the 2020-2045 RTP/SCS (Connect SoCal)

The Project's inconsistency with the General Plan's Policies and Programs is reflected in the comparable policies promulgated by other local and regional plans, including the 2020-2045 RTP/SCS (Connect SoCal). As discussed above in the section evaluating impacts to Agricultural Resources, all Imperial County farmland is considered Important Farmland and should be reserved for agricultural uses. 148 The conversion of agricultural land to nonagricultural uses is authorized "only where a clear and immediate need can be demonstrated." 149 As previously discussed, Program 1 implements the Policy constraining farmland conversion by allowing for conversion only where "a clear long term economic benefit to the County can be demonstrated through the planning and environmental review process." 150

F.44

Furthermore, the DEIR's analysis of impacts related to land use and planning demonstrates the Project's inconsistency with, in addition to the County's General Plan, the 2020-2045 RTP/SCS (Connect SoCal). Two goals adopted by the 2020-2045 RTP/SCS (Connect SoCal) are applicable to the Project:

- Reduce GHG emissions and improve air quality
- Promote conservation of natural and agricultural lands and restoration of habitats¹⁵¹

It's plain that the Project's purpose and objectives are in alignment the first goal. The second goal, however, clearly brings the 2020-2045 RTP/SCS (Connect



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 $^{^{147}}$ CEQA Guidelines § 15125(d); CEQA Guidelines, Appendix G, Section XI.

 $^{^{148}}$ 2015 Imperial County General Plan, Agricultural Element, Policy 1: Preservation of Important Farmland, p. 39.

 $^{^{149}} Id.$

¹⁵⁰ Id.

¹⁵¹ DEIR, p. 3.11-5.

⁵³⁶⁵⁻⁰⁰⁵acp

SoCal) into conflict with the Project's land use practices. The Project's proposal to convert 205 acres of Farmland of Statewide Importance, 12 acres of Farmland of Local Importance, 4.4 acres of Prime Farmland, and 1 acre of Unique Farmland to nonagricultural use is a clear inconsistency with the goals, objectives, and policies of the local and regional plans. ¹⁵²

Despite this clear divergence between the goals of the Project and those of local and regional plans, the DEIR maintains, without support, that the Project does not conflict with policies found in either the General Plan or the 2020-2045 RTP/SCS (Connect SoCal) due to the "temporary" nature of the Project's farmland conversion:

The project would temporarily convert Prime Farmland, Farmland of Statewide Importance, and Unique Farmland to non-agricultural uses. However, as a condition of project approval (CUP condition), the project applicant or its successor in interest will be responsible for implementing a reclamation plan when the project is decommissioned at the end of its lifespan. The reclamation plan includes the removal, recycling, and/or disposal of all solar arrays, inverters, transformers, and other structures on the project site, as well as restoration of the site to its pre-project condition. Therefore, the proposed project would not permanently convert Prime Farmland, Farmland of Statewide Importance, and Unique Farmland to non-agricultural uses. Therefore, no impacts due to a conflict with the 2020-2045 RTP/SCS (Connect SoCal) would occur. 153

Fatal to this reasoning, however, is that the entire structure of the analysis upon which the conclusion rests is founded on one unsupported presumption: that the farmland conversion is considered "temporary." Substantial evidence from Mr. House demonstrates that the Project's impacts on agricultural lands are indisputably long-term, and may have permanent, adverse effects on the land if not adequately mitigated. Lacking any evidence to supports its assertion of "temporary" impacts, the DEIR's unsupported conclusion that the Project is consistent with local and regional plans and will not result in significant and unmitigated impacts, dissolves.

¹⁵² DEIR, p. 3.3-1.

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F.44 cont.

¹⁵³ DEIR, pp. 3.11-13-14.

Because there is no requirement that the Project be decommissioned after any specific time and because, per the DEIR's repeated assertion that the future permittee has the discretion to recommission the Project as many times as desired, there is no guarantee that a reclamation plan will ever be promulgated, the DEIR has no evidence to support its conclusion that the site will be restored to its current condition and returned to agricultural use.

F.44 cont.

ii. The Findings Required for Approval of the General Plan Amendment and Zone Change Cannot be Made

The Project, located in the General Agriculture zone within the Geothermal Overlay Zone (A-2-G), lies entirely outside the Renewable Energy Overlay Zone, which authorizes the development and operation of renewable energy projects with an approved CUP. CUP applications proposed for specific renewable energy projects not located in the RE Overlay Zone would not be allowed without an amendment to the RE Overlay Zone. ¹⁵⁴

An amendment to the RE Overlay Zone, according to the General Plan's Renewable Energy and Transmission Element, may be approved only if the proposed project meets the applicable approval criteria, depending on whether the project is adjacent to the existing RE Overlay Zone or seeks an "Island Overlay" amendment. None of the Project's parcels are located adjacent to any RE Overlay Zone parcel. The Project must therefore meet the criteria for an "Island Overlay" in order to obtain approval of an amendment to the RE Overlay Zone. The "Island Overlay" criteria require that the Project:

F.45

- Is located adjacent (sharing a common boundary) to an existing transmission source
- Consists of the expansion of an existing renewable energy operation
- Would not result in any significant environmental impacts. 155

The DEIR reasons that the Project is consistent with all three criteria, supported by the following arguments:

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¹⁵⁴ DEIR, p. 3.11-6.

¹⁵⁵ DEIR, p. 3.1-14.

1. The Project is located adjacent (sharing a common boundary) to an existing transmission source:

"There are existing IID power poles along N Best Avenue and Andre Road. The project includes a gen-tie line that would connect to the IID's existing North Brawley Geothermal Power Plant substation, located west of the project site's southern boundary at Hovley Road and Andre Road. The gen-tie route would be approximately 1.8 miles."

2. The Project is an expansion of an existing renewable energy operation:

The Project includes a gen-tie line that would connect it to IID's North Brawley Geothermal Power Plant substation and because "the proposed project would be capable of generating up to 40 MW of solar energy, thereby expanding renewable energy generation in the area."

3. The Project would not result in any significant environmental effects:

No significant and unavoidable impacts were identified. Where significant impacts have been identified, mitigation measures are proposed that, when implemented, would reduce the impact level to less than significant.

The DEIR's analysis of purported consistency with the Island Overlay approval criteria is clearly erroneous. Though the IID power poles the run along the boundary of the Project site may be considered "transmission sources," they will not connect to the Project in any way. The gen-tie line, which will connect the Project to the North Brawley Geothermal Power Plant substation, is an element of the Project to be constructed and is therefore not "existing." The transmission source to which the Project will connect, the Geothermal Power Plant substation, is not adjacent to the Project site.

Furthermore, neither "operation" of which the DEIR claims the Project is an "expansion" satisfies the criteria of #2. The Project's connection to the North Brawley Geothermal Power Plant substation merely serves to provide the Project with an avenue for delivering the electricity it generates to the grid. The two facilities are not otherwise connected, and the Project is certainly not an "expansion" of the Power Plant. Moreover, the assertion that the Project would expand "renewable energy generation in the area" thereby satisfies the requirement that it be "expansion of an existing renewable energy operation" is a clear 5365-005acp

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F.45 cont

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F.47

misinterpretation of the criteria's assessment of a project's qualification for inclusion in the RE Overlay Zone.

F.47 cont.

Finally, despite the DEIR's claim that the Project would result in no significant environmental impacts, our review of the County's environmental review of the Project and its impacts reveals significant and unmitigated impacts, as well as several areas of concern where the County abdicated its duty to analyze all impacts resulting from the Project. The Project does not meet the criteria required for approval of an amendment to the RE Overlay Zone. Because solar energy facilities are not permitted in zones not included in the RE Overlay Zone, the Project must revise its environmental review and correct these deficiencies to bring it into compliance with the requirements of the General Plan.

F.48

g. The DEIR Fails to Analyze and Mitigate Potentially Significant Project Impacts to Water Supply

Appendix H of the DEIR indicates that untreated Colorado River water will be supplied to the project site via the Best Canal under an Industrial Water Supply Agreement ("IWSP") with IID. 156 Project operations are expected to use approximately 3.1 acre-feet per year ("AFY") (amortized to 5.06 AFY after considering water usage during construction and decommissioning over a 30-year period). 157 This represents a substantial decrease—a reduction of 831.63 AFY—from the historic 10-year average demand of the site's current agricultural use. 158

F.49

This surplus of water, an increasingly valuable resource as the state's population continues to expand, is already being watched by IID. The DEIR's Water Supply Assessment indicates that the Water District is considering the water surplus generated by the conversion by several solar energy projects in the region of agricultural land to nonagricultural uses. As the nonagricultural, residential demand continues to grow in Imperial Valley, IID is considering its options to meet demand in the event it exhausts its existing entitlements and obligations. ¹⁵⁹ In a discussion of the possibility to meet increased demands with the surplus supplies left behind when agricultural uses are converted for solar facilities, the Water Supply Assessment notes that IID cannot rely on these supplies being permanently

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¹⁵⁶ DEIR, Appendix H, Water Supply Assessment, p. 55.

¹⁵⁷ *Id.*, p. 59.

 $^{^{158}} Id.$

¹⁵⁹ Appendix H, p. 62.

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available: "should a solar project decommission early, that land may go immediately back to agricultural use." 160 Still, the Assessment asserted, "solar farms do ameliorate pressure on IID to implement projects to meet demand from new nonagricultural projects."161

This trend, Mr. House explains, suggests a more somber picture than the Water Supply Assessment implies: "This water will not go unused. Water sales and transfers are now relatively common in California, and many of these sales and transfers are to municipal and industrial uses in far-away places. Permanent loss of this water from the subject property is a distinct possibility."162 The DEIR's assumption that the Water District would someday suddenly reallocate the original agricultural water supply used at the Project site prior to Project development after that water has been diverted to other demands for years—or even decades—is entirely unsupported and makes the concept of a "temporary" agricultural conversion even more inconceivable.

h. The DEIR Fails to Identify, Analyze, and Mitigate Potentially Significant Impacts to Special-Status Species

The DEIR failed to provide an even remotely adequate analysis of Project impacts to biological resources, including special-status species, perhaps not surprising given the document's inadequate and flawed description of the site's existing environmental setting. As Dr. Smallwood explains, an erroneous and incomplete picture of the existing setting leads to underestimated impact estimates.

> i. The DEIR's Analysis of Impacts to a Wildlife Corridor is Based on an Erroneous Standard of Analysis

As Dr. Smallwood points out, the DEIR's analysis of Project impacts on a wildlife corridor is based on an inaccurate and partial interpretation of CEQA's threshold of significance. CEQA asks a project proponent to consider whether the project "would interfere substantially with the movement of any native resident or migratory fish and wildlife species or with established native resident or migratory

 160 Id., p. 63.

¹⁶² House Comments, p. 6.

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F.49 cont

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wildlife corridors." ¹⁶³ The DEIR, finding that the Project would have no impact, answers only that the site "does not function as a wildlife corridor." ¹⁶⁴

Dr. Smallwood's site visit, however, revealed

thousands of birds flying north and south across the site, parallel to the New River. Some of the birds flew high enough to suffer no interference to their movement should the project be built, but too many of them flew low to the ground where they would either have to alter their flight trajectories or risk collision with the project's fence, gen-tie or PV panels. Significantly, a flock of tricolored blackbirds — a threatened species — flew across the site at heights ranging from a few inches to a few feet off the ground.

F.51 cont.

Furthermore, the DEIR's interpretation of the threshold of significance narrows the question to only whether a wildlife corridor exists on the site, not, Dr. Smallwood explains, on whether the project will "interfere substantially with the movement of any native resident or migratory fish and wildlife species." ¹⁶⁵ As the Project will clearly interfere substantially with the multitude of birds and other wildlife he saw crossing through or over the site, it is clear that the threshold of significance has been exceeded, and the Project's impacts are significant and unmitigated. The DEIR must be revised and recirculated to identify and mitigate this significant impact.

ii. The DEIR Fails to Analyze and Mitigate Potentially Significant Impacts to Wildlife as a Result of Habitat Loss

Despite detecting the presence of several special-status species during site reconnaissance surveys, the DEIR inexplicably performed no analysis of the impacts upon wildlife due to the permanent loss of habitat at the Project site. Habitat loss is a particularly important metric by which to evaluate a project's impacts to wildlife. Dr. Smallwood explains that not only does habitat loss result in the immediate decline in wildlife numbers as species are expelled from the site, but also in permanent loss of productive capacity. ¹⁶⁶ A quick, rough estimate of the potential

F.52

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¹⁶³ CEQA Guidelines, Appendix G.

¹⁶⁴ DEIR, p. 3.5-26.

¹⁶⁵ Smallwood Comments, p. 26.

¹⁶⁶ Smallwood Comments, p. 27.

loss of nests at the site using actual nest numbers from two other study sites (adjusted to account for different environmental conditions), as well as average fledgling numbers taken from well-cited studies, Dr. Smallwood estimates that the Project's 227 acres of lost habitat, over a 40-year lifetime, could potentially result in a deficit of 513,888 birds over 40 years—12,847 per year—due solely to the loss of the Project site as viable habitat. These numbers, Dr. Smallwood notes, are significant.

F.52 cont.

Dr. Smallwood's survey of the Project site revealed the presence of numerous special-status species "and many other I would likely detect with an extended survey effort." Construction of the Project would signal the loss of habitat for many of these species, including northern harrier, merlin, California gull and many others listed in Dr. Smallwood's Table 3.168 This elimination of some of the only remaining useful habitat for many of the area's special-status species must be properly and thoroughly analyzed in a revised DEIR.

iii. The DEIR Fails to Analyze and Mitigate Potentially Significant Impacts to Birds and Bats as a Result of Collision with Project Components

The DEIR omits any discussion of the potential for significant Project impacts to birds and bats as a result of collision with Project components, including PV panels, 6-foot fencing, 1.8 miles of gen-tie, battery banks, substation, and additional ancillary equipment. Dr. Smallwood points out that "[a]ll of these structures would be inserted into a portion of the aerosphere that is of critical importance to volant wildlife, including wildlife that fly at night." To estimate potential impacts of collision mortality at the Project site, Dr. Smallwood reviewed available fatality monitoring reports at 14 other utility-scale solar projects in the state and using the mean fatality estimates caused by individual project components at the other facilities, he predicted potential Project collision mortality impacts. 170

F.53

 40 MW PV panels—Using a weighted mean based on fatality monitoring at utility-scale solar projects and adjusting the formula for a 40-MW facility, Dr. Smallwood estimates that the Project's PV panels

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¹⁶⁷ Smallwood Comments, p. 27.

¹⁶⁸ Smallwood Comments, pp. 22-25

¹⁶⁹ Smallwood Comments, p. 28.

 $^{^{170}}$ Smallwood Comments, p. 28. 5365-005acp

could result in the deaths of 464 birds per year and 2 bats per year, or 18,560 birds and 80 bats over 40 years. ¹⁷¹ The panels' death toll, however, is not limited to 40 years and would continue for as long as the Project continues to be recommissioned. 172

- Gen-tie line—Fatality monitoring along gen-tie lines at solar facilities in the state provided the basis for calculating potential avian deaths along the Project's 1.8-mile long gen-tie, estimated at 328 birds killed per year, or 13,120 over 40 years.¹⁷³
- Fencing—The weighted mean adjusted for Project-specific details estimated that the Project's fence could kill 134 birds per year, 5,360 over 40 years. 174 Dr. Smallwood notes that based on his reviews of the state's utility-scale solar facilities, he concluded that greater roadrunners, which occur at the Project site, are "particularly vulnerable to mortality on perimeter security fences at utility-scale solar projects." 175

F.53 cont.

Each impact above from collision mortality, taken in isolation, is significant and unmitigated. Considered together, they indicate a potentially devastating scenario for the wildlife in the vicinity of the Project site. The DEIR must be revised to thoroughly analyze and mitigate significant impacts.

iv. The DEIR Proposes Mitigation Measures that are Unenforceable, Vague, and Ineffective

Mitigation Measures BIO-1 though BIO-4 are intended to reduce any potential impacts to special-status species present at the site during construction to

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¹⁷¹ *Id*.

¹⁷² Id

 $^{^{178}}$ Id.; Dr. Smallwood points out that this weighted mean fatality rate was based on gen-ties that had been mitigated in the same way as proposed by the DEIR, rendering the fatality rate here a significant and unmitigated impact.

 $^{^{174}}$ Id.; Dr. Smallwood notes that the DEIR has not proposed any mitigation for bird mortality caused by the Project's fence, and because no other solar project has demonstrated fatality reduction along its fences, this predicted level of mortality would easily qualify as an unmitigated significant impact. 176 Id.

less-than-significant levels. 176 All four measures, however, are either unenforceable or of little efficacy.

Dr. Smallwood explains that MM BIO-1, assuring that "All electrical components on the project site shall be either undergrounded or protected so that there will be no exposure to wildlife and therefore no potential for electrocution," cannot in practice be enforced. While undergrounding will protect birds from collisions with transmission lines, the DEIR reports that the gen-tie's lines would be mounted on 66-foot-tall poles.¹⁷⁷ "Birds cannot be protected from colliding with these lines to any degree greater than achieved by line markers deployed at other solar projects where fatalities were monitored and fatality rates reported."178

MM BIO-2, BIO-3, and BIO-4, Dr. Smallwood notes, are of little efficacy in minimizing harm to burrowing owl and other nesting birds. MM BIO-2, Worker Environmental Awareness Program, should be encouraged to increase worker awareness, but will do little to reduce or prevent collisions or habitat loss. MM BIO-3 and BIO-4, meanwhile, propose preconstruction surveys to minimize and avoid harm to burrowing owls and other nesting birds. While Dr. Smallwood agrees that preconstruction surveys should be done, they would not be effective at identifying what a detection survey would show and should not serve as a substitute for detection surveys, which would be inconsistent with the survey and mitigation guidelines of CDFW.¹⁷⁹ Furthermore, because nesting birds are "highly adept" at remaining undiscovered, Dr. Smallwood notes that conducting preconstruction surveys "[o]ver such a large area and with such dense shrubs around site, the notion that more than a few animals would be detected would be fantasy."180

> v. The DEIR Must Implement Mitigation Measures Intended to Reduce Significant Impacts to Species

Dr. Smallwood recommends several measures designed to reduce harm to species resulting from Project activity. Compensatory mitigation through measures like preservation in perpetuity of an area of equal open space close to the Project site and contributions to a wildlife rehabilitation facility to help injured animalssome, perhaps, who have collided with Project infrastructure—would be specific and

¹⁷⁶ DEIR, p. 3.5-20.

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F.54 cont.

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¹⁷⁷ DEIR, p. 2-8.

¹⁷⁸ Smallwood Comments, p. 31.

¹⁷⁹ Smallwood Comments, p. 31.

¹⁸⁰ Smallwood Comments, p. 31. 5365-005acp

effective mitigation. Alterations to the Project's fencing, by reducing the fence length and using a different type of fencing that increases opacity, as well as including gaps to enable non-volant wildlife to pass through, would be effective at minimizing interference with wildlife movement.¹⁸¹

Dr. Smallwood also recommends an adaptive management approach, using a combination of fatality monitoring and behavioral surveys as part of a post-construction impacts monitoring plan. All of these suggested measures would be more effective at reducing harm to species than the proposed measures in the DEIR. The DEIR must be revised and recirculated, and should include mitigation that is not vague and ineffectual.

VI. THE DEIR FAILS TO ADQUATELY ANALYZE CUMULATIVE PROJECT IMPACTS

An EIR is required to discuss the cumulative impacts of a project "when the project's incremental effect is cumulatively considerable." ¹⁸³ Cumulative impact analyses are necessary because "environmental damage often occurs incrementally from a variety of small sources [that] appear insignificant when considered individually, but assume threatening dimensions when considered collectively with other sources with which they interact." ¹⁸⁴ Mere conclusory statements are not sufficient to satisfy the cumulative impacts analysis requirement. ¹⁸⁵ A proper cumulative impacts analysis must be supported by references to specific evidence. ¹⁸⁶ As the Court in *Mountain Lion Coalition* explained, "it is vitally important that an EIR avoid minimizing the cumulative impacts. Rather, it must reflect a conscientious effort to provide public agencies and the general public with adequate and relevant detailed information about them." ¹⁸⁷ "A cumulative impacts analysis which understates information concerning the severity and significance of cumulative impacts impedes meaningful public discussion and skews the decisionmaker's perspective concerning the environmental consequences of the

F.55 cont.

F.56



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¹⁸¹ *Id.*, p. 32.

¹⁸² Id., pp. 32-33.

^{183 14} CCR § 15130(a).

¹⁸⁴ Communities for a Better Env't v. Cal. Res. Agency (2002) 103 Cal. App. 4th 98, 114.

¹⁸⁵ Mountain Lion Coalition v. Fish & Game Comm'n (1989) 214 Cal. App. 3d 1043, 1047.

 $^{^{186}}$ Id.

 $^{^{187}}$ Id. at 1051.

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project, the necessity for mitigation measures, and the appropriateness of project approval. $^{"188}$

F.56 cont.

Furthermore, the Guidelines specifically direct agencies to "define the geographic scope of the area affected by the cumulative effect and provide a reasonable explanation for the geographic limitation used." ¹⁸⁹ An EIR's cumulative impacts discussion "should be guided by the standards of practicality and reasonableness," but several elements are deemed "necessary to an adequate discussion of significant cumulative impacts" including "[a] list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency." ¹⁹⁰

The DEIR evaluated the cumulative impacts for each area of concern by according to an "expanded list" method:

- Define the geographic and temporal scope of cumulative impact analysis for each cumulative effects issue, based on the project's reasonably foreseeable direct and indirect effects.
- 2. Evaluate the cumulative effects of the project in combination with past and present (existing) and reasonably foreseeable future projects and, in the larger context of the Imperial Valley.
- 3. Evaluate the project's incremental contribution to the cumulative effects on each resource considered in Chapter 3, Environmental Analysis. When the project's incremental contribution to a significant cumulative impact is considerable, mitigation measures to reduce the project's "fair share" contribution to the cumulative effect are discussed, where required. 191

The DEIR considered 29 other projects in the vicinity of the Project in its analysis of cumulative effects. The DEIR found no impacts from any area of concern it analyzed that would be considered cumulatively considerable. The DEIR acknowledges the definition of "cumulatively considerable" found in the CEQA Guidelines: "The incremental effects of an individual project are significant when

F.57

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 $^{^{188}} Id.$

¹⁸⁹ 14 CCR § 15130(b)(3); Bakersfield Citizens for Local Control v. City of Bakersfield (2004) 124 Cal.App.4th 1184, 1216.

 $^{^{190}}$ 14 CCR § 15130(b); Rialto Citizens for Responsible Growth v. City of Rialto (2012) 208 Cal. App.4th 899, 928-29.

¹⁹¹ DEIR, p. 5-1.

¹⁹² See DEIR, pp. 5-1-15.

viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects." However, the DEIR seems unable to apply this definition to analysis of cumulative impacts, instead relying on the flawed approach that whereby any impact that was significant but mitigated to levels less than significant cannot contribute to the cumulative effects of that impact. ¹⁹³ This reasoning, Dr. Smallwood points out, "implies that cumulative impacts are really just residual impacts of incomplete mitigation." ¹⁹⁴ This approach has been rejected by the Courts, and fails to comply with CEQA's requirement that a project mitigate impacts that are "cumulatively considerable." ¹⁹⁵

F.57 cont'd

In Friends of Oroville, the City of Oroville prepared an EIR for a retail center project. The EIR failed to analyze the project's cumulative contribution to significant GHG impacts by concluding, without analysis, that the project's "miniscule" GHG emissions were insignificant in light of the state's cumulative, state-wide GHG emissions problem. The EIR had concluded that a further analysis of the project's GHG impacts would result in "applying a meaningless, relative number to determine an insignificant impact." The court of appeal rejected what amounted to an outright dismissal of the City's obligation to analyze the retail center's cumulative GHG impacts. 197

F.58

Similarly, in Kings County Farm Bureau v. City of Hanford, ¹⁹⁸ the city prepared an EIR for a 26.4-megawatt coal-fired cogeneration plant. Notwithstanding the fact that the EIR found that the project region was out of attainment for PM10 and ozone, the City failed to incorporate mitigations for the project's cumulative air quality impacts from project emissions because it concluded that the Project would contribute "less than one percent of area emissions for all criteria pollutants." ¹⁹⁹ The city reasoned that, because the project's air emissions were small in ratio to existing air quality problems, that this necessarily rendered the project's "incremental contribution" minimal under CEQA. The court rejected this approach, finding it "contrary to the intent of CEQA." The court stated:

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¹⁹⁸ See, e.g., DEIR, pp. 5-8, 5-9, 5-10.

¹⁹⁴ Smallwood Comments, p. 30.

 ¹⁹⁵ PRC § 21083(b)(2); 14 CCR § 15130; Friends of Oroville v. City of Oroville (2013) 219 Cal. App. 4th
 832, 841-42; Kings County Farm Bureau v. City of Hanford (1990) 221 Cal. App. 3d 692, 721.
 196 219 Cal. App. 4th at 841-42.
 197 Id.

¹⁹⁸ (1990) 221 Cal. App. 3d 692, 721.

 $^{^{199}}$ $\dot{I}d.$ at 719.

⁵³⁶⁵⁻⁰⁰⁵acp

> We find the analysis used in the EIR and urged by GWF avoids analyzing the severity of the problem and allows the approval of projects which, when taken in isolation, appear insignificant, but when viewed together, appear startling. Under GWF's "ratio" theory, the greater the over-all problem, the less significance a project has in a cumulative impacts analysis. We conclude the standard for a cumulative impacts analysis is defined by the use of the term "collectively significant" in Guidelines section 15355 and the analysis must assess the collective or combined effect of energy development. The EIR improperly focused upon the individual project's relative effects and omitted facts relevant to an analysis of the collective effect this and other sources will have upon air quality.200

F.58 cont

Similarly here, if the DEIR's logic that any impact that has been mitigated to less than significant levels would not contribute cumulatively to a significant impact were applied universally, then no impacts would ever accumulate to significant levels. The DEIR claims that because its impacts on Agricultural Resources are "temporary" and mitigated by a vague, future, undefined reclamation plan, it cannot contribute to the cumulatively considerable impacts on Agricultural Resources. By this logic, all the farmland in Imperial County could be taken out of agricultural production tomorrow and converted to use as utility-scale solar facilities. As long as they all promised to be temporary in nature—meaning they might, or might not, restore the land in 30 or 40 years, or not-there would be no adverse consequences.

F.59

This lack of analysis is precisely what the courts have rejected. A revised DEIR must be prepared which properly analyzes and mitigates all of the Project's potentially significant cumulative impacts.

F.60

VII. CONCLUSION

The DEIR fails to comply with the clear directives of CEQA starting with its failure to accurately describe the Project and the Project site's existing environmental baseline. It further fails to accurately disclose, analyze, and mitigate impacts to agricultural resources, air quality, special-status species, and public health.

F.61

200 Id. at 721. 5365-005acp

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We urge the County to fulfill its responsibilities under CEQA by performing a legally adequate environmental review and revising the DEIR to rectify the legal errors and address the Project's potentially significant impacts. A revised DEIR must be recirculated for public review and comment so that decision-makers and the public may have a meaningful opportunity to assess the Project's potentially significant impacts. We respectfully urge the County to do so prior to any further consideration of the Project.

F.62

Sincerely,

Kendra Hartmann

Attachments

KDH:acp

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EXHIBIT A



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February 10, 2022

Kendra Hartmann Adams Broadwell Joseph & Cardozo 601 Gateway Blvd #1000 South San Francisco, CA 94080

Subject: Comments on the Brawley Solar Energy Facility Project (SCH No. 2021070424)

Dear Ms. Hartmann,

We have reviewed the December 2021 Draft Environmental Impact Report ("DEIR") for the Brawley Solar Energy Facility Project ("Project") located in the City of Brawley ("City"). The Project proposes to construct a new 40 megawatts ("MW") solar facility, consisting of 13 blocks of 49,517 photovoltaic panels, an onsite, 92/12 kilovolt (kV) substation, a 40 MW battery energy storage system ("BESS"), and associated infrastructure on the 227-acre site.

Our review concludes that the DEIR fails to adequately evaluate the Project's hazards and hazardous materials, air quality, health risk, and greenhouse gas impacts. As a result, emissions and health risk impacts associated with construction and operation of the proposed Project are underestimated and inadequately addressed. An updated EIR should be prepared to adequately assess and mitigate the potential hazards and hazardous materials, air quality, health risk, and greenhouse gas impacts that the project may have on the surrounding environment.

Hazards and Hazardous Materials

Inadequate Disclosure and Analysis of Impacts

No Phase I Environmental Site Assessment ("ESA") was prepared for the Project site. The preparation of a Phase I ESA is often undertaken in the preparation of CEQA documents to identify hazardous waste issues that may present impacts to the public, workers, or the environment, and which may require further investigation, including environmental sampling and cleanup. Instead of a Phase I ESA, the DEIR relied only upon an internet-based search of regulatory databases, including Geotracker and Envirostor (p. 3.9-1). The reliance only upon these regulatory databases provides an insufficient basis for determining Project significance for Hazards and Hazardous Materials impacts.

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The preparation of a Phase I ESA for the Project site is especially important given current and former use for agriculture. Residual concentrations of pesticides may be present in soil at the Project site from pesticide application to crops. Worker exposure to residual pesticides may occur when soil is disturbed for grading and excavation.

Standards for performing a Phase I ESA have been established by the US EPA and the American Society for Testing and Materials Standards ("ASTM"). Phase I ESAs are conducted to identify conditions that would indicate a release of hazardous substances and include:

- a review of all known sites in the vicinity of the subject property that are on regulatory agency databases undergoing assessment or cleanup activities;
- an inspection:
- interviews with people knowledgeable about the property; and
- recommendations for further actions to address potential hazards.

Phase I ESAs conclude with the identification of any "recognized environmental conditions" ("RECs") and recommendations to address such conditions. A REC is the presence or likely presence of any hazardous 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 structures on the property or into the ground, groundwater, or surface water of the property. If RECs are identified, then a Phase II ESA generally follows, which includes the collection of soil, soil vapor and groundwater samples, as necessary, to identify the extent of contamination and the need for cleanup to reduce exposure potential to the public.

A Phase I ESA, completed by a licensed environmental professional, is necessary for inclusion in an updated EIR to identify recognized environmental conditions, if any, at the proposed Project site. If past land uses include RECs, a Phase II should be conducted to sample for residual concentrations of contaminants in soil, including pesticides. Any contamination that is identified above regulatory screening levels, including California Department of Toxic Substances Control Soil Screening Levels², should be further evaluated and cleaned up, if necessary, in coordination with the Regional Water Quality Control Board and the California Department of Toxic Substances Control.

Air Quality

Unsubstantiated Input Parameters Used to Estimate Project Emissions

The Project's air quality analysis relies on emissions calculated with CalEEMod.2020.4.0 (p. 3.4-15).³ CalEEMod provides recommended default values based on site-specific information, such as land use type, meteorological data, total lot acreage, project type and typical equipment associated with project type. If more specific project information is known, the user can change the default values and input project-specific values, but the California Environmental Quality Act ("CEQA") requires that such changes be justified by substantial evidence. Once all of the values are inputted into the model, the Project's

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¹ http://www.astm.org/Standards/E1527.htm

² https://dtsc.ca.gov/wp-content/uploads/sites/31/2019/04/HHRA-Note-3-June-2020-A.pdf

³ "CalEEMod User's Guide." California Air Pollution Control Officers Association (CAPCOA), May 2021, available at: http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/01_user-39-s-guide2020-4-0.pdf?sfvrsn=6.

construction and operational emissions are calculated, and "output files" are generated. These output files disclose to the reader what parameters are utilized in calculating the Project's air pollutant emissions and make known which default values are changed as well as provide justification for the values selected.

When reviewing the Project's CalEEMod output files, provided in the CalEEMod Model Daily Printouts and the CalEEMod Model Annual Printouts as Appendix A and C, respectively, to the Air Quality, Energy, and Greenhouse Gas Emissions Impact Analysis ("AQ & GHG Analysis"), we found that several model inputs were not consistent with information disclosed in the DEIR and associated documents. As a result, the Project's construction and operational emissions may be underestimated.

Unsubstantiated Changes to Material Silt Content Values

Review of the CalEEMod output files demonstrates that the "Brawley Solar Energy Facility" model includes several reductions to the default material silt content values (Appendix A, pp. 636, 658; Appendix C, pp. 683).

Table Name	Column Name	Default Value	New Value
tblOnRoadDust	MaterialSiltContent	8.50	3.00
tblOnRoadDust	MaterialSiltContent	8.50	3.00
tblOnRoadDust	MaterialSiltContent	8.50	3.00

As you can see in the excerpt above, the material silt content was decreased from the default value of 8.5% to 3%. As previously mentioned, the CalEEMod User's Guide requires any changes to model defaults be justified. According to the "User Entered Comments & Non-Default Data" table, the justification provided for these changes is: "Per Rule ICAPCD Rule 805 F.1.c — Material Silt Content set to 3%" (Appendix A, pp. 635, 657; Appendix C, pp. 683). Furthermore, the DEIR states:

"The Material Silt Content was changed to 3 percent in order to account for ICAPCD Rule 805 F.1.c that requires the installation of gravel or other low silt material with less than 5 percent silt content on all onsite roads" (p. 3.4-15).

However, these changes are unsupported and cannot be relied upon to estimate Project impacts. Furthermore, review of ICAPCD Rule 805 demonstrates that F.1.c is a best available control measure, and is one among a list of measures to choose from, rather than a strict requirement. Furthermore, Rule 805 F.1.c only suggests a material silt content of less than 5%, not 3%. As such, the revised material silt content values included in the model are not required and, thus, artificially lower the fugitive dust emissions without requiring binding mitigation on the Applicant. Until the DEIR incorporates a formal mitigation measure requiring the Project to install a 3% material silt content on all onsite roads, the revised material silt content values are unsubstantiated.

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⁴ "CalEEMod User's Guide." California Air Pollution Control Officers Association (CAPCOA), May 2021, available at: http://www.aamd.gov/caleemod/user's-guide, p. 1, 12.

⁵ "RULE 805 PAVED AND UNPAVED ROADS." Imperial County Air Pollution Control District, October 2012, available at: https://apcd.imperialcounty.org/wp-content/uploads/2020/05/1RULE805.pdf, p. 805-3.

These unsubstantiated changes artificially lower the material silt content, and thus the fugitive dust emissions, as calculated in the following equations:⁶⁷

$$EF_{\it TSP} = {C_{\it TSP} imes s^{1.2} \over M^{1.3}}$$
 , and $EF_{\it PM2.5} = EF_{\it TSP} imes F_{\it PM2.5}$

$$\mathsf{EF_{PM15}} = \frac{\mathsf{C_{PM15}} \times \mathsf{S}^{1.5}}{\mathsf{M}^{1.4}} \text{, and } EF_{PM10} = EF_{PM15} \times F_{PM10}$$

Where:

EF = emission factor (lb/hr)

C = arbitrary coefficient used by AP-42

M = material moisture content (%)

S = material silt content (%)

F = scaling factor

As demonstrated above, there is a direct relationship between material silt content and dust emission factors. As such, when the material silt content percentage decreases, the dust emission factor decreases as well. As a result, by including unsubstantiated decreases to the material silt content values, the model may underestimate the fugitive dust emissions. Thus, the model may underestimate the Project's construction-related emissions and should not be relied upon to determine Project significance.

Unsubstantiated Changes to On-Road and Road Percent Paved Values

Review of the CalEEMod output files demonstrates that the "Brawley Solar Energy Facility" model includes several increases to the default percent paved values for the Project's construction vendor and worker trips, as well as operational vehicle trips (Appendix A, pp. 636, 658; Appendix C, pp. 683).

Table Name	Column Name	Default Value	New Value
tblOnRoadDust	VendorPercentPave	50.00	85.00
tblOnRoadDust	VendorPercentPave	50.00	85.00
tblOnRoadDust	VendorPercentPave VendorPercentPave	50.00	85.00
tblOnRoadDust	WorkerPercentPave	50.00	85.00
tblOnRoadDust	WorkerPercentPave	50.00	85.00
tblOnRoadDust	WorkerPercentPave	50.00	85.00
tblRoadDust	RoadPercentPave	50	99

As you can see in the excerpt above, the vendor and worker paved percent values were increased from the default value of 50% to 85%, while the operational vehicle percent paved values were increased from the default value of 50% to 99%. As previously mentioned, the CalEEMod User's Guide requires any

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⁶ "Appendix A Calculation Details for CalEEMod." available at: http://www.aqmd.gov/docs/default-source/caleemod/02 appendix-a2016-3-2.pdf?sfvrsn=6, p. 10.

⁷ "Appendix A Calculation Details for Calcul

⁷ "Appendix A Calculation Details for CalEEMod." available at: http://www.aqmd.gov/docs/default-source/caleemod/02 appendix-a2016-3-2.pdf?sfvrsn=6, p. 10.

changes to model defaults be justified.⁸ According to the "User Entered Comments & Non-Default Data" table, the justifications provided for the changes are:

- "99% roads paved;" and
- "85% of trips on pavement" (Appendix A, pp. 635, 657; Appendix C, pp. 683).

Furthermore, the DEIR states:

"The following On-Road Fugitive Dust construction parameters were revised in the CalEEMod model: (1) The percent on-road pavement was changed to 85 percent to account for Best Avenue that is adjacent to the project site being paved" (p. 3.4-15).

However, these changes remain unsupported for two reasons.

First, the DEIR and associated documents fail to mention or justify the operational vehicle percent paved percentage whatsoever. As a result, we cannot verify the revised value of 99%.

Second, simply stating that "[t]he percent on-road pavement was changed to 85 percent to account for Best Avenue that is adjacent to the project site" is insufficient. According to the CalEEMod User's Guide:

"[T]he user can override the defaults if data specific to the project is known. Local jurisdictions can also provide guidance to users as to what default properly reflects known regional road dust parameters."9

Here, however, the DEIR and associated documents do not provide "data specific to the project" or a source that reflects the specific 85% value. As a result, the revised road percent paved values are unsubstantiated.

These unsubstantiated changes present an issue, as CalEEMod uses the percentage of paved roads to determine the fugitive dust emissions from on-road vehicles. ¹⁰ As a result, by including unsubstantiated changes to the default percent paved values for the Project's construction-related and operational trips, the Project's construction-related and operational emissions may be underestimated, and the models should not be relied upon to determine Project significance.

Incorrect Water Use Rate

Review of the CalEEMod output files demonstrates that the "Brawley Solar Energy Facility" model includes several reductions to the default indoor water use rates (see excerpt below) (Appendix A, pdf pp. 637, 659; Appendix C, pdf pp. 685).

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⁸ "CalEEMod User's Guide." California Air Pollution Control Officers Association (CAPCOA), May 2021, available at: http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/01 user-39-s-guide2020-4-0.pdf?sfvrsn=6, p. 1, 12.

⁹ CalEEMod User Guide, available at: http://www.caleemod.com/, p. 39

¹⁰ CalEEMod User Guide, available at: http://www.caleemod.com/, p. 35

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		-

Table Name	Column Name	Default Value	New Value
tblWater	IndoorWaterUseRate	12,087,437.50	0.00
tblWater	IndoorWaterUseRate	23,310,000.00	263,939.00

As previously mentioned, the CalEEMod User's Guide requires any changes to model defaults be justified.¹¹ According to the "User Entered Comments and Non-Default Data" table, the justification provided for these changes is: "The project will use 0.81 acre feet or 263,939 gallons per year" (Appendix A, pdf pp. 635, 657; Appendix C, pdf pp. 683). However, regarding the Project's estimated annual water consumption, the DEIR states:

"Estimated annual water consumption for operation and maintenance of the proposed project, including periodic PV module washing and fire suppression, would be approximately 3.1-acre feet per year (AFY), which would be supplied to the project site via the adjacent Best Canal and trucked to the project site as needed" (p. 2-12).

As such, according to the DEIR, the Project will use 3.1 acre feet per year ("AFY"). Thus, the 0.81 AFY water use rate assumed in the model is incorrect and underestimated.

This inconsistency presents an issue, as CalEEMod uses indoor water use rates to estimate the amount of wastewater, which has direct emissions of GHGs. ¹² Thus, by including an incorrect indoor water use rate, the model underestimates the Project's water-related operational emissions and should not be relied upon to determine Project significance.

Diesel Particulate Matter Health Risk Emissions Inadequately Evaluated

The DEIR concludes that the proposed Project would have a less-than-significant health risk impact to nearby sensitive receptors without conducting a quantified construction or operational health risk analysis ("HRA"). Specifically, regarding the Project's construction-related health risk impacts, the DEIR states:

"Given the relatively limited number of heavy-duty construction equipment, the varying distances that construction equipment would operate to the nearby sensitive receptors, and the short-term construction schedule, the proposed project would not result in a long-term (i.e., 30 or 70 years) substantial source of toxic air contaminant emissions and corresponding individual cancer risk. In addition, California Code of Regulations Title 13, Article 4.8, Chapter 9, Section 2449 regulates emissions from off-road diesel equipment in California. This regulation limits idling of equipment to no more than five minutes, requires equipment operators to label each piece of equipment and provide annual reports to CARB of their fleet's usage and emissions. This regulation also requires systematic upgrading of the emission Tier level of each fleet, and

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¹¹ "CalEEMod User's Guide." California Air Pollution Control Officers Association (CAPCOA), May 2021, available at: http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/01 user-39-s-guide2020-4-0.pdf?sfvrsn=6, p. 1, 12.

¹² "CalEEMod User's Guide." California Air Pollution Control Officers Association (CAPCOA), May 2021, available at: http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/01 user-39-s-guide2020-4-0.pdf?sfvrsn=6, p. 44, 45.

currently no commercial operator is allowed to purchase Tier 0 or Tier 1 equipment and by January 2023 no commercial operator is allowed to purchase Tier 2 equipment. In addition to the purchase restrictions, equipment operators need to meet fleet average emissions targets that become more stringent each year between years 2014 and 2023. By January 2022, 50 percent or more of all contractors' equipment fleets must be Tier 2 or higher. Therefore, no significant short-term toxic air contaminant impacts would occur during construction of the proposed project. As such, construction of the proposed project would result in a less than significant exposure of sensitive receptors to substantial pollutant concentrations" (p. 3.4-22).

As demonstrated above, the DEIR concludes that the Project would result in a less-than-significant construction-related health risk impact because the short-term construction schedule and compliance with regulations regarding off-road diesel equipment would not result in significant toxic air contaminant ("TAC") emissions. Furthermore, regarding the Project's operational health risk impacts, the DEIR states:

"The proposed project would consist of the development of a solar facility with a BESS and a substation. Although the proposed solar PV panels, the lithium batteries utilized in the BESS, and the transformers utilized in the substation are made with toxic materials, only a negligible amount of TAC emissions are emitted from off-gassing from the PV panels, which would not create TAC concentrations high enough to create a significant cancer risk from TAC emissions. In addition, the proposed project would include a backup diesel generator, which would emit DPM emissions, which is categorized as a TAC. The backup diesel generator would be located in the southwest portion of the project site, where the nearest offsite sensitive receptor is a home on the east side of Best Avenue located approximately 1,900 feet to the east. Due to the distance that the nearest sensitive receptor, a less than significant TAC impact would occur from the backup diesel generator. Therefore, a less than significant TAC impact would occur during the ongoing operations of the proposed project" (p. 3.4-22).

As demonstrated above, the DEIR concludes that the Project would result in a less-than-significant operational health risk impact because the proposed land uses and the distance of the backup diesel generator to any sensitive receptors would not result in significant TAC emissions. However, the DEIR's evaluation of the Project's potential health risk impacts, as well as the subsequent less-than-significant impact conclusion, is incorrect for three reasons.

First, by failing to prepare a quantified construction and operational HRA, the Project is inconsistent with CEQA's requirement to correlate the increase in emissions that the Project would generate to the adverse impacts on human health caused by those emissions. This is incorrect, as construction of the proposed Project would produce diesel particulate matter ("DPM") emissions through the exhaust stacks of construction equipment over a potential construction period of approximately 9 months (2-10). Furthermore, according to the DEIR operation of the Project would include approximately 160 truck trips annually that would generate additional exhaust emissions and continue to expose nearby sensitive receptors to DPM emissions during Project operation (Appendix C, Air Quality, p. 41). However, the DEIR fails to evaluate Project-generated TACs or indicate the concentrations at which such pollutants would

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trigger adverse health effects. Thus, without making a reasonable effort to connect the Project's construction-related and operational TAC emissions to the potential health risks posed to nearby receptors, the DEIR is inconsistent with CEQA's requirement to correlate the increase in emissions generated by the Project with the potential adverse impacts on human health.

F A-9 cont'd

Second, the DEIR's conclusion is also inconsistent with the most recent guidance published by the Office of Health Hazard Assessment ("OEHHA"), the organization responsible for providing guidance on conducting HRAs in California, as well as local air district guidelines. OEHHA released its most recent Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments in February 2015. ¹³ This guidance document describes the types of projects that warrant the preparation of an HRA. The OEHHA document recommends that all short-term projects lasting at least two months be evaluated for cancer risks to nearby sensitive receptors. As the Project's construction duration exceeds the 2-month recommendation suggested by OEHHA, it is clear that the Project falls under OEHHA's short-term evaluation guidance.

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Third, by claiming a less than significant impact without conducting a quantified construction or operational HRA for nearby, existing sensitive receptors, the DEIR is inconsistent with ICAPCD. Specifically, ICAPCD guidance states:

F A-11

"Development projects which locate in close proximity to already existing industrial type operations which have the potential to emit toxic or hazardous air pollutants, even at a very low level of emissions, may be considered significant because of the increased cancer risk to the incoming population. This is also true of development projects which have the potential to emit toxic or hazardous air pollutants and are located in close proximity to sensitive receptors. Such projects may be required to prepare a health risk assessment to determine the potential level of risk associated with the operation. The ICAPCD should be consulted on any project with the potential to emit toxic or hazardous air pollutants." 14

As previously discussed, the Project has the potential to emit TAC emissions. Thus, in accordance with the most relevant guidance, an assessment of the health risk posed to nearby, existing receptors from Project construction should have been conducted.

Greenhouse Gas & Energy

Failure to Adequately Evaluate Greenhouse Gas and Energy Impacts

The DEIR estimates that the Project would generate net annual greenhouse gas ("GHG") emissions of -4,319.54 metric tons of carbon dioxide equivalents per year ("MT CO₂e/year"), respectively, which would not exceed the CAPCOA significance threshold of 900 MT CO₂e/year (see excerpt below) (3.8-12).

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¹³ "Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments." California Office of Environmental Health Hazard Assessment (OEHHA), February 2015, available at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf.

¹⁴ "CEQA Air Quality Handbook." Imperial County Air Pollution Control District, December 2017, available at: https://apcd.imperialcounty.org/wp-content/uploads/2020/01/CEQAHandbk.pdf, p. 15.

Table 3.8-3. Project Operation-Related Greenhouse Gas Emissions

	Greenhouse Gas Emissions (Metric Tons per Year)			
Category	CO2	CH ₄	N ₂ O	CO ₂ e
Area Sources ¹	0.01	0.00	0.00	0.01
Energy Usage and Production ²	-4,299.50	-0.75	-0.09	-4,345.14
Mobile Sources ³	5.35	0.00	0.00	5.44
Backup Generator ⁴	0.61	0.00	0.00	0.62
Solid Waste ⁵	0.00	0.00	0.00	0.00
Water and Wastewater ⁶	0.38	0.01	0.00	0.66
Construction ⁷	18.63	0.00	0.00	18.88
Total GHG Emissions	-4,274.52	-0.73	-0.09	-4,319.54
CAPCOA Significance Threshold				900
Exceed CAPCOA Significance Threshold?				No

As a result, the DEIR concludes:

"Increasing sources of solar energy is one of the measures identified under the Scoping Plan to reduce statewide GHG emissions. The proposed project would reduce GHG emissions in a manner consistent with SB 32 and other California GHG-reducing legislation by creating a new source of solar power to replace the current use of fossil-fuel power and reduce GHG emissions power generation and use. Implementation of the proposed project would result in a less than significant impact associated with the potential to conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emission of GHG" (p. 3.8-12 - 3.8-13).

However, the DEIR's GHG analysis, as well as the subsequent less-than-significant impact conclusion, is incorrect for three reasons:

- (1) The DEIR fails to adequately disclose the Project's operational energy calculations;
- (2) The DEIR fails to evaluate the direct energy and GHG impacts from energy consumed by operating the BESS; and
- (3) The DEIR fails to evaluate the indirect GHG emissions associated with the BESS.

1) Inadequate Analysis and Disclosure of Energy Impacts

Regarding the Project's anticipated energy use, the DEIR states:

"The on-going operation of the proposed project would require the use of energy resources for multiple purposes including, but not limited to, heating/ventilating/air conditioning (HVAC), lighting, and electronics [...]

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Area sources consist of GHG emissions from consumer products, architectural coatings, and landscaping equipment

Area sources consist of GHG emissions from electricity used and generated onsite.

Shobile sources consist of GHG emissions from electricity used and generated onsite.

Mobile sources consist of GHG emissions from vehicles.

Backup Generator based on a 20 kW G2 Horsepower) diesel generator that has a cycling schedule of 30 minutes per week.

Solid Waste. Since no employees would be onsite during typical operations, no solid waste is anticipated to be generated from

the project.

Water includes GHG emissions from electricity used for transport of water and processing of wastewater.

Construction emissions amortized over 30 years as recommended in the SCAQMD GHG Working Group on November 19, 2009.

Source: Appendix C of this EIR

Operation of the proposed project would result in consumption and production of electricity at the project site. The proposed PV solar panels will generate 97,333,333 kWh per year of electricity and operation of the project will use 1,946,667 kWh per year of electricity, which would result in the net generation of 95,386,667 kWh per year of electricity. This equates to 2.8 percent of the electricity consumed annually by IID. As such, the operations-related electricity use would provide a significant renewable resource for the IID and would help IID achieve the State' Renewable Portfolio Standards requirement for non-carbon sources of electricity. No impact would occur from electricity-related energy consumption from the proposed project" (p. 6-3).

F A-13 cont'd

Furthermore, according to the AQ & GHG Analysis:

"Since according to the BESS system specifications, the air conditioning units and power conversion associated with the proposed BESS will not use more than 2 percent of the electricity stored, the calculated 97,333,333 kWh generated by the solar panels was multiplied by 2 percent, which results in the proposed project utilizing 1,946,667 kWh per year that was entered into the CalEEMod" (p. 41).

However, the DEIR's energy analysis is insufficient for two reasons. First, the DEIR and associated documents fail to provide calculations substantiating the alleged operational energy use value of 1,946,667 kilowatt hour ("kWh") per year. Second, the AQ & GHG Analysis fails to provide a source for the claim that the "the air conditioning units, control systems, ventilators, inverters, and transformers and power conversion associated with the proposed BESS will not use more than 2 percent of the electricity stored" (p. 41). Furthermore, as we cannot locate the above-mentioned BESS system specifications, we cannot verify that the BESS is only anticipated to use 2% of the stored energy. As such, absent additional information regarding the Project's operational energy use calculations, the DEIR's energy analysis should not be relied upon to determine Project significance.

2) Failure to Describe BESS Operation and Direct Energy and Air Quality/GHG Impacts Regarding the battery energy storage system ("BESS"), the DEIR states:

"The proposed project's BESS component would be placed on a 54,000 square-foot concrete pad at the southern edge of the project site. The BESS would consist of 12 banks of batteries totaling up to 432 enclosures. Each bank of batteries would be supported by a DC Combiner, control panel, and inverter/transformer skid. Each of the enclosures would utilize self-contained liquid cooling systems and include built-in fire suppression systems. All batteries would be lithium-ion based capable of storing 40 MW (not to exceed 80 MW)" (p. 2-7).

However, the DEIR fails to provide information or supporting evidence regarding the amount of electricity needed to operate the BESS, the storage efficiency of the BESS, or the expected energy output of the batteries (e.g. the percentage of the original charging energy that will be available for discharge by the BESS after consuming energy to operate). This information is essential to estimate the direct energy and air quality/GHG impacts from operating the BESS as part of the Project.

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The DEIR asserts that the storage capacity of the BESS will not exceed 80 megawatts ("MW") but does not explain how that capacity is calculated or describe the BESS's storage efficiency (p. ES-1). The overall storage efficiency (also called "round-trip efficiency")¹⁵ addresses the amount of energy generation that is required to operate the BESS. Like any electrical device, BESS's consume energy to operate. Thus, in order to store energy, the Project's BESS would use some of the energy it absorbs for its own operation. As a result, the BESS will discharge less energy back to the grid than it initially absorbs, resulting in imperfect round-trip efficiency.

F A-14 cont'd

BESS's are not stand-alone generation sources and must buy electricity supplied by other generators to recharge and cover the round-trip efficiency losses experienced during cycles of charging and discharging. ¹⁶ This is a key difference in the operation of a BESS as compared to the solar PV facility, which generates its own electricity without the roundtrip inefficiency created by a BESS. The BESS, on the other hand, stores, uses, and redistributes energy that has been generated by another source. As a result of this inefficiency, an updated EIR should be prepared that addresses and evaluates the Project's direct energy and air quality impacts associated with the BESS pursuant to CEQA.

3) Failure to Evaluate Indirect GHG Emissions Associated with the BESS

The DEIR fails to mention or evaluate the indirect GHG emissions associated with the proposed BESS. Specifically, according to the DEIR:

"Once the project is constructed and operational, the proposed project would have no major stationary emission sources and would require minimal vehicular trips. The proposed project is anticipated to generate GHG emissions from area sources, energy usage and production, mobile sources, waste disposal, and water usage" (p. 3.8-11).

F A-15

However, as demonstrated above, the proposed Project fails to account for the energy usage associated specifically with the operation of the BESS. This, as well as the less-than-significant GHG impact conclusion, is incorrect for two reasons.

First, the batteries in the BESS may need to be charged with energy from the grid, which does not contain a 100% renewable energy mix, when the solar facility is not generating power. Specifically, renewable energy constituted 33.09% of California's total energy mix in 2020.¹⁷ As such, unless the developer commits to only charge the BESS with generation from the adjoining solar power plant, the proposed Project would increase GHG emissions.

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¹⁵ Round-trip efficiency is the battery system efficiency over one cycle, measured as the amount of energy discharged to a specified depth over the amount of energy consumed to bring the system back up to its specified initial state of charge. See U.S. Energy Information Administration | US. Battery Storage Market Trends, p. 14, available at: https://www.eia.gov/analysis/studies/electricity/batterystorage/pdf/battery-storage.pdf. ¹⁶ Id. at p. 19.

Second, energy storage is not neutral in terms of energy use or emissions. Studies demonstrate that energy storage increases energy use due to "energy arbitrage," the practice of storing energy during Offpeak periods, when energy is cheapest, and discharging energy during Peak-periods, when energy is most expensive. However, this occurs without regard to the electricity source that charges the battery. This poses a problem, as storing energy increases the value of the energy sources it draws from and, when discharged, decreases the value of the energy sources it competes against. Thus, if the BESS is charged at night with energy from the grid, rather than during the day from the solar facility, the BESS promotes the use of non-renewable energy. As such, unless the developer commits to only charge the BESS with generation from the adjoining solar power plant and demonstrates with substantial evidence that such a condition is feasible, the proposed Project would increase GHG emissions. As a result, the Project's GHG analysis should not be relied upon to determine Project.

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Disclaimer

SWAPE has received limited discovery regarding this project. Additional information may become available in the future; thus, we retain the right to revise or amend this report when additional information becomes available. Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable environmental consultants practicing in this or similar localities at the time of service. No other warranty, expressed or implied, is made as to the scope of work, work methodologies and protocols, site conditions, analytical testing results, and findings presented. This report reflects efforts which were limited to information that was reasonably accessible at the time of the work, and may contain informational gaps, inconsistencies, or otherwise be incomplete due to the unavailability or uncertainty of information obtained or provided by third parties.

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Sincerely,

M Gracus Matt Hagemann, P.G., C.Hg.

Paul E. Rosenfeld, Ph.D.

¹⁸ Eric S. Hittinger and Ines M.L. Azevedo, *Bulk Energy Storage Increase United states Electricity System Emissions*, J. OF ENV. SCI. TECH. (2015) available at https://doi.org/10.1021/es505027p.

¹⁹ Over 50% of the energy currently supplied to the CAISO grid is produced by fossil fuels, including predominantly natural gas. See CAISO Current Supply and Renewables, accessed 9/8/21, available at http://www.caiso.com/todaysoutlook/pages/supply.aspx.

0.2 Response to Comments Final EIR | Brawley Solar Energy Facility Project

> Attachment A: Matt Hagemann CV Attachment B: Paul E. Rosenfeld CV

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Attachment A



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Matt Hagemann, P.G, C.Hg. (949) 887-9013 mhagemann@swape.com

Matthew F. Hagemann, P.G., C.Hg., QSD, QSP

Geologic and Hydrogeologic Characterization Investigation and Remediation Strategies Litigation Support and Testifying Expert Industrial Stormwater Compliance CEQA Review

Education:

M.S. Degree, Geology, California State University Los Angeles, Los Angeles, CA, 1984. B.A. Degree, Geology, Humboldt State University, Arcata, CA, 1982.

Professional Certifications:

California Professional Geologist California Certified Hydrogeologist Qualified SWPPP Developer and Practitioner

Professional Experience:

Matt has 30 years of experience in environmental policy, contaminant assessment and remediation, stormwater compliance, and CEQA review. He spent nine years with the U.S. EPA in the RCRA and Superfund programs and served as EPA's Senior Science Policy Advisor in the Western Regional Office where he identified emerging threats to groundwater from perchlorate and MTBE. While with EPA, Matt also served as a Senior Hydrogeologist in the oversight of the assessment of seven major military facilities undergoing base closure. He led numerous enforcement actions under provisions of the Resource Conservation and Recovery Act (RCRA) and directed efforts to improve hydrogeologic characterization and water quality monitoring. For the past 15 years, as a founding partner with SWAPE, Matt has developed extensive client relationships and has managed complex projects that include consultation as an expert witness and a regulatory specialist, and a manager of projects ranging from industrial stormwater compliance to CEQA review of impacts from hazardous waste, air quality and greenhouse gas emissions.

Positions Matt has held include:

- Founding Partner, Soil/Water/Air Protection Enterprise (SWAPE) (2003 present);
- Geology Instructor, Golden West College, 2010 2104, 2017;
- Senior Environmental Analyst, Komex H2O Science, Inc. (2000 -- 2003);

- Executive Director, Orange Coast Watch (2001 2004);
- Senior Science Policy Advisor and Hydrogeologist, U.S. Environmental Protection Agency (1989– 1998);
- Hydrogeologist, National Park Service, Water Resources Division (1998 2000);
- Adjunct Faculty Member, San Francisco State University, Department of Geosciences (1993 1998);
- Instructor, College of Marin, Department of Science (1990 1995);
- Geologist, U.S. Forest Service (1986 1998); and
- Geologist, Dames & Moore (1984 1986).

Senior Regulatory and Litigation Support Analyst:

With SWAPE, Matt's responsibilities have included:

- Lead analyst and testifying expert in the review of over 300 environmental impact reports
 and negative declarations since 2003 under CEQA that identify significant issues with regard
 to hazardous waste, water resources, water quality, air quality, greenhouse gas emissions,
 and geologic hazards. Make recommendations for additional mitigation measures to lead
 agencies at the local and county level to include additional characterization of health risks
 and implementation of protective measures to reduce worker exposure to hazards from
 toxins and Valley Fever.
- Stormwater analysis, sampling and best management practice evaluation at more than 100 industrial facilities.
- Expert witness on numerous cases including, for example, perfluorooctanoic acid (PFOA)
 contamination of groundwater, MTBE litigation, air toxins at hazards at a school, CERCLA
 compliance in assessment and remediation, and industrial stormwater contamination.
- Technical assistance and litigation support for vapor intrusion concerns.
- Lead analyst and testifying expert in the review of environmental issues in license applications for large solar power plants before the California Energy Commission.
- Manager of a project to evaluate numerous formerly used military sites in the western U.S.
- Manager of a comprehensive evaluation of potential sources of perchlorate contamination in Southern California drinking water wells.
- Manager and designated expert for litigation support under provisions of Proposition 65 in the review of releases of gasoline to sources drinking water at major refineries and hundreds of gas stations throughout California.

With Komex H2O Science Inc., Matt's duties included the following:

- Senior author of a report on the extent of perchlorate contamination that was used in testimony by the former U.S. EPA Administrator and General Counsel.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of MTBE use, research, and regulation.
- Senior researcher in the development of a comprehensive, electronically interactive chronology
 of perchlorate use, research, and regulation.
- Senior researcher in a study that estimates nationwide costs for MTBE remediation and drinking
 water treatment, results of which were published in newspapers nationwide and in testimony
 against provisions of an energy bill that would limit liability for oil companies.
- Research to support litigation to restore drinking water supplies that have been contaminated by MTBE in California and New York.

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- Expert witness testimony in a case of oil production-related contamination in Mississippi.
- Lead author for a multi-volume remedial investigation report for an operating school in Los Angeles that met strict regulatory requirements and rigorous deadlines.
- Development of strategic approaches for cleanup of contaminated sites in consultation with clients and regulators.

Executive Director:

As Executive Director with Orange Coast Watch, Matt led efforts to restore water quality at Orange County beaches from multiple sources of contamination including urban runoff and the discharge of wastewater. In reporting to a Board of Directors that included representatives from leading Orange County universities and businesses, Matt prepared issue papers in the areas of treatment and disinfection of wastewater and control of the discharge of grease to sewer systems. Matt actively participated in the development of countywide water quality permits for the control of urban runoff and permits for the discharge of wastewater. Matt worked with other nonprofits to protect and restore water quality, including Surfrider, Natural Resources Defense Council and Orange County CoastKeeper as well as with business institutions including the Orange County Business Council.

Hydrogeology:

As a Senior Hydrogeologist with the U.S. Environmental Protection Agency, Matt led investigations to characterize and cleanup closing military bases, including Mare Island Naval Shipyard, Hunters Point Naval Shipyard, Treasure Island Naval Station, Alameda Naval Station, Moffett Field, Mather Army Airfield, and Sacramento Army Depot. Specific activities were as follows:

- Led efforts to model groundwater flow and contaminant transport, ensured adequacy of monitoring networks, and assessed cleanup alternatives for contaminated sediment, soil, and groundwater.
- Initiated a regional program for evaluation of groundwater sampling practices and laboratory analysis at military bases.
- Identified emerging issues, wrote technical guidance, and assisted in policy and regulation development through work on four national U.S. EPA workgroups, including the Superfund Groundwater Technical Forum and the Federal Facilities Forum.

At the request of the State of Hawaii, Matt developed a methodology to determine the vulnerability of groundwater to contamination on the islands of Maui and Oahu. He used analytical models and a GIS to show zones of vulnerability, and the results were adopted and published by the State of Hawaii and County of Maui.

As a hydrogeologist with the EPA Groundwater Protection Section, Matt worked with provisions of the Safe Drinking Water Act and NEPA to prevent drinking water contamination. Specific activities included the following:

- Received an EPA Bronze Medal for his contribution to the development of national guidance for the protection of drinking water.
- Managed the Sole Source Aquifer Program and protected the drinking water of two communities through designation under the Safe Drinking Water Act. He prepared geologic reports, conducted

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- public hearings, and responded to public comments from residents who were very concerned about the impact of designation.
- Reviewed a number of Environmental Impact Statements for planned major developments, including large hazardous and solid waste disposal facilities, mine reclamation, and water transfer.

Matt served as a hydrogeologist with the RCRA Hazardous Waste program. Duties were as follows:

- Supervised the hydrogeologic investigation of hazardous waste sites to determine compliance with Subtitle C requirements.
- Reviewed and wrote "part B" permits for the disposal of hazardous waste.
- Conducted RCRA Corrective Action investigations of waste sites and led inspections that formed
 the basis for significant enforcement actions that were developed in close coordination with U.S.
 EPA legal counsel.
- Wrote contract specifications and supervised contractor's investigations of waste sites.

With the National Park Service, Matt directed service-wide investigations of contaminant sources to prevent degradation of water quality, including the following tasks:

- Applied pertinent laws and regulations including CERCLA, RCRA, NEPA, NRDA, and the Clean Water Act to control military, mining, and landfill contaminants.
- Conducted watershed-scale investigations of contaminants at parks, including Yellowstone and Olympic National Park.
- Identified high-levels of perchlorate in soil adjacent to a national park in New Mexico and advised park superintendent on appropriate response actions under CERCLA.
- Served as a Park Service representative on the Interagency Perchlorate Steering Committee, a national workgroup.
- Developed a program to conduct environmental compliance audits of all National Parks while serving on a national workgroup.
- Co-authored two papers on the potential for water contamination from the operation of personal
 watercraft and snowmobiles, these papers serving as the basis for the development of nationwide policy on the use of these vehicles in National Parks.
- Contributed to the Federal Multi-Agency Source Water Agreement under the Clean Water Action Plan.

Policy:

Served senior management as the Senior Science Policy Advisor with the U.S. Environmental Protection Agency, Region 9.

Activities included the following:

- Advised the Regional Administrator and senior management on emerging issues such as the
 potential for the gasoline additive MTBE and ammonium perchlorate to contaminate drinking
 water supplies.
- Shaped EPA's national response to these threats by serving on workgroups and by contributing
 to guidance, including the Office of Research and Development publication, Oxygenates in
 Water: Critical Information and Research Needs.
- Improved the technical training of EPA's scientific and engineering staff.
- Earned an EPA Bronze Medal for representing the region's 300 scientists and engineers in negotiations with the Administrator and senior management to better integrate scientific

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principles into the policy-making process.

Established national protocol for the peer review of scientific documents.

Geology:

With the U.S. Forest Service, Matt led investigations to determine hillslope stability of areas proposed for timber harvest in the central Oregon Coast Range. Specific activities were as follows:

- Mapped geology in the field, and used aerial photographic interpretation and mathematical models to determine slope stability.
- Coordinated his research with community members who were concerned with natural resource protection.
- Characterized the geology of an aquifer that serves as the sole source of drinking water for the city of Medford, Oregon.

As a consultant with Dames and Moore, Matt led geologic investigations of two contaminated sites (later listed on the Superfund NPL) in the Portland, Oregon, area and a large hazardous waste site in eastern Oregon. Duties included the following:

- · Supervised year-long effort for soil and groundwater sampling.
- Conducted aquifer tests.
- Investigated active faults beneath sites proposed for hazardous waste disposal.

Teaching:

From 1990 to 1998, Matt taught at least one course per semester at the community college and university levels:

- At San Francisco State University, held an adjunct faculty position and taught courses in environmental geology, oceanography (lab and lecture), hydrogeology, and groundwater contamination.
- Served as a committee member for graduate and undergraduate students.
- Taught courses in environmental geology and oceanography at the College of Marin.

Matt is currently a part time geology instructor at Golden West College in Huntington Beach, California where he taught from 2010 to 2014 and in 2017.

<u>Invited Testimony, Reports, Papers and Presentations:</u>

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Presentation to the Public Environmental Law Conference, Eugene, Oregon.

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Invited presentation to U.S. EPA Region 9, San Francisco, California.

Hagemann, M.F., 2005. Use of Electronic Databases in Environmental Regulation, Policy Making and Public Participation. Brownfields 2005, Denver, Coloradao.

Hagemann, M.F., 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Nevada and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Las Vegas, NV (served on conference organizing committee).

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Hagemann, M.F., 2004. Invited testimony to a California Senate committee hearing on air toxins at schools in Southern California, Los Angeles.

Brown, A., Farrow, J., Gray, A. and **Hagemann, M.**, 2004. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to the Ground Water and Environmental Law Conference, National Groundwater Association.

Hagemann, M.F., 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Arizona and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Phoenix, AZ (served on conference organizing committee).

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in the Southwestern U.S. Invited presentation to a special committee meeting of the National Academy of Sciences, Irvine, CA.

 $\label{eq:hagemann} \textbf{M.F.}, 2003. \ \ Perchlorate Contamination of the Colorado River. \ \ Invited presentation to a tribal EPA meeting, Pechanga, CA.$

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a meeting of tribal repesentatives, Parker, AZ.

Hagemann, M.F., 2003. Impact of Perchlorate on the Colorado River and Associated Drinking Water Supplies. Invited presentation to the Inter-Tribal Meeting, Torres Martinez Tribe.

Hagemann, M.F., 2003. The Emergence of Perchlorate as a Widespread Drinking Water Contaminant. Invited presentation to the U.S. EPA Region 9.

Hagemann, M.F., 2003. A Deductive Approach to the Assessment of Perchlorate Contamination. Invited presentation to the California Assembly Natural Resources Committee.

Hagemann, M.F., 2003. Perchlorate: A Cold War Legacy in Drinking Water. Presentation to a meeting of the National Groundwater Association.

 $\label{eq:hadden} \textbf{Hagemann}, \textbf{M.F.}, 2002. \ \ \text{From Tank to Tap: A Chronology of MTBE in Groundwater.} \ \ \text{Presentation to a meeting of the National Groundwater Association.}$

Hagemann, M.F., 2002. A Chronology of MTBE in Groundwater and an Estimate of Costs to Address Impacts to Groundwater. Presentation to the annual meeting of the Society of Environmental Journalists.

Hagemann, M.F., 2002. An Estimate of the Cost to Address MTBE Contamination in Groundwater (and Who Will Pay). Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to a meeting of the U.S. EPA and State Underground Storage Tank Program managers.

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Hagemann, M.F., 2001. From Tank to Tap: A Chronology of MTBE in Groundwater. Unpublished report.

Hagemann, M.F., 2001. Estimated Cleanup Cost for MTBE in Groundwater Used as Drinking Water. Unpublished report.

Hagemann, M.F., 2001. Estimated Costs to Address MTBE Releases from Leaking Underground Storage Tanks. Unpublished report.

Hagemann, M.F., and VanMouwerik, M., 1999. Potential Water Quality Concerns Related to Snowmobile Usage. Water Resources Division, National Park Service, Technical Report.

Van Mouwerik, M. and **Hagemann**, M.F. 1999, Water Quality Concerns Related to Personal Watercraft Usage. Water Resources Division, National Park Service, Technical Report.

Hagemann, M.F., 1999, Is Dilution the Solution to Pollution in National Parks? The George Wright Society Biannual Meeting, Asheville, North Carolina.

Hagemann, M.F., 1997, The Potential for MTBE to Contaminate Groundwater. U.S. EPA Superfund Groundwater Technical Forum Annual Meeting, Las Vegas, Nevada.

Hagemann, M.F., and Gill, M., 1996, Impediments to Intrinsic Remediation, Moffett Field Naval Air Station, Conference on Intrinsic Remediation of Chlorinated Hydrocarbons, Salt Lake City.

Hagemann, M.F., Fukunaga, G.L., 1996, The Vulnerability of Groundwater to Anthropogenic Contaminants on the Island of Maui, Hawaii Water Works Association Annual Meeting, Maui, October 1996.

Hagemann, M. F., Fukanaga, G. L., 1996, Ranking Groundwater Vulnerability in Central Oahu, Hawaii. Proceedings, Geographic Information Systems in Environmental Resources Management, Air and Waste Management Association Publication VIP-61.

Hagemann, M.F., 1994. Groundwater Characterization and Cleanup at Closing Military Bases in California. Proceedings, California Groundwater Resources Association Meeting.

Hagemann, M.F. and Sabol, M.A., 1993. Role of the U.S. EPA in the High Plains States Groundwater Recharge Demonstration Program. Proceedings, Sixth Biennial Symposium on the Artificial Recharge of Groundwater.

Hagemann, M.F., 1993. U.S. EPA Policy on the Technical Impracticability of the Cleanup of DNAPL-contaminated Groundwater. California Groundwater Resources Association Meeting.

Hagemann, M.F., 1992. Dense Nonaqueous Phase Liquid Contamination of Groundwater: An Ounce of Prevention... Proceedings, Association of Engineering Geologists Annual Meeting, v. 35.

Other Experience:

Selected as subject matter expert for the California Professional Geologist licensing examinations, 2009-2011.

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Attachment B



SOIL WATER AIR PROTECTION ENTERPRISE

2656 29th Street, Suite 201
Santa Monica, California 90405
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Fax: (310) 452-5555
Email: prosenfeld@swape.com

Paul Rosenfeld, Ph.D.

Chemical Fate and Transport & Air Dispersion Modeling

Principal Environmental Chemist

Risk Assessment & Remediation Specialist

Education

Ph.D. Soil Chemistry, University of Washington, 1999. Dissertation on volatile organic compound filtration.

M.S. Environmental Science, U.C. Berkeley, 1995. Thesis on organic waste economics.

B.A. Environmental Studies, U.C. Santa Barbara, 1991. Thesis on wastewater treatment.

Professional Experience

Dr. Rosenfeld has over 25 years' experience conducting environmental investigations and risk assessments for evaluating impacts to human health, property, and ecological receptors. His expertise focuses on the fate and transport of environmental contaminants, human health risk, exposure assessment, and ecological restoration. Dr. Rosenfeld has evaluated and modeled emissions from oil spills, landfills, boilers and incinerators, process stacks, storage tanks, confined animal feeding operations, industrial, military and agricultural sources, unconventional oil drilling operations, and locomotive and construction engines. His project experience ranges from monitoring and modeling of pollution sources to evaluating impacts of pollution on workers at industrial facilities and residents in surrounding communities. Dr. Rosenfeld has also successfully modeled exposure to contaminants distributed by water systems and via vapor intrusion.

Dr. Rosenfeld has investigated and designed remediation programs and risk assessments for contaminated sites containing lead, heavy metals, mold, bacteria, particulate matter, petroleum hydrocarbons, chlorinated solvents, pesticides, radioactive waste, dioxins and furans, semi- and volatile organic compounds, PCBs, PAHs, creosote, perchlorate, asbestos, per- and poly-fluoroalkyl substances (PFOA/PFOS), unusual polymers, fuel oxygenates (MTBE), among other pollutants. Dr. Rosenfeld also has experience evaluating greenhouse gas emissions from various projects and is an expert on the assessment of odors from industrial and agricultural sites, as well as the evaluation of odor nuisance impacts and technologies for abatement of odorous emissions. As a principal scientist at SWAPE, Dr. Rosenfeld directs air dispersion modeling and exposure assessments. He has served as an expert witness and testified about pollution sources causing nuisance and/or personal injury at sites and has testified as an expert witness on numerous cases involving exposure to soil, water and air contaminants from industrial, railroad, agricultural, and military sources.

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Professional History:

Soil Water Air Protection Enterprise (SWAPE); 2003 to present; Principal and Founding Partner

UCLA School of Public Health; 2007 to 2011; Lecturer (Assistant Researcher)

UCLA School of Public Health; 2003 to 2006; Adjunct Professor

UCLA Environmental Science and Engineering Program; 2002-2004; Doctoral Intern Coordinator

UCLA Institute of the Environment, 2001-2002; Research Associate

Komex H₂O Science, 2001 to 2003; Senior Remediation Scientist

National Groundwater Association, 2002-2004; Lecturer

San Diego State University, 1999-2001; Adjunct Professor

Anteon Corp., San Diego, 2000-2001; Remediation Project Manager

Ogden (now Amec), San Diego, 2000-2000; Remediation Project Manager

Bechtel, San Diego, California, 1999 – 2000; Risk Assessor

King County, Seattle, 1996 – 1999; Scientist

James River Corp., Washington, 1995-96; Scientist

Big Creek Lumber, Davenport, California, 1995; Scientist

Plumas Corp., California and USFS, Tahoe 1993-1995; Scientist

Peace Corps and World Wildlife Fund, St. Kitts, West Indies, 1991-1993; Scientist

Publications:

Remy, L.L., Clay T., Byers, V., Rosenfeld P. E. (2019) Hospital, Health, and Community Burden After Oil Refinery Fires, Richmond, California 2007 and 2012. *Environmental Health*. 18:48

Simons, R.A., Seo, Y. **Rosenfeld, P.**, (2015) Modeling the Effect of Refinery Emission On Residential Property Value. Journal of Real Estate Research. 27(3):321-342

Chen, J. A, Zapata A. R., Sutherland A. J., Molmen, D.R., Chow, B. S., Wu, L. E., **Rosenfeld, P. E.,** Hesse, R. C., (2012) Sulfur Dioxide and Volatile Organic Compound Exposure To A Community In Texas City Texas Evaluated Using Aermod and Empirical Data. *American Journal of Environmental Science*, 8(6), 622-632.

Rosenfeld, P.E. & Feng, L. (2011). The Risks of Hazardous Waste. Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & Rosenfeld, P.E. (2011). Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Agrochemical Industry, Amsterdam: Elsevier Publishing.

Gonzalez, J., Feng, L., Sutherland, A., Waller, C., Sok, H., Hesse, R., **Rosenfeld, P.** (2010). PCBs and Dioxins/Furans in Attic Dust Collected Near Former PCB Production and Secondary Copper Facilities in Sauget, IL. *Procedia Environmental Sciences*. 113–125.

Feng, L., Wu, C., Tam, L., Sutherland, A.J., Clark, J.J., Rosenfeld, P.E. (2010). Dioxin and Furan Blood Lipid and Attic Dust Concentrations in Populations Living Near Four Wood Treatment Facilities in the United States. *Journal of Environmental Health*. 73(6), 34-46.

Cheremisinoff, N.P., & Rosenfeld, P.E. (2010). Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Wood and Paper Industries. Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & Rosenfeld, P.E. (2009). Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Petroleum Industry. Amsterdam: Elsevier Publishing.

Wu, C., Tam, L., Clark, J., Rosenfeld, P. (2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. WIT Transactions on Ecology and the Environment, Air Pollution, 123 (17), 319-327.

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Tam L. K.., Wu C. D., Clark J. J. and **Rosenfeld, P.E.** (2008). A Statistical Analysis Of Attic Dust And Blood Lipid Concentrations Of Tetrachloro-p-Dibenzodioxin (TCDD) Toxicity Equivalency Quotients (TEQ) In Two Populations Near Wood Treatment Facilities. *Organohalogen Compounds*, 70, 002252-002255.

Tam L. K.., Wu C. D., Clark J. J. and **Rosenfeld, P.E.** (2008). Methods For Collect Samples For Assessing Dioxins And Other Environmental Contaminants In Attic Dust: A Review. *Organohalogen Compounds*, 70, 000527-000530.

Hensley, A.R. A. Scott, J. J. J. Clark, **Rosenfeld, P.E.** (2007). Attic Dust and Human Blood Samples Collected near a Former Wood Treatment Facility. *Environmental Research*. 105, 194-197.

Rosenfeld, P.E., J. J. J. Clark, A. R. Hensley, M. Suffet. (2007). The Use of an Odor Wheel Classification for Evaluation of Human Health Risk Criteria for Compost Facilities. *Water Science & Technology* 55(5), 345-357.

Rosenfeld, P. E., M. Suffet. (2007). The Anatomy Of Odour Wheels For Odours Of Drinking Water, Wastewater, Compost And The Urban Environment. *Water Science & Technology* 55(5), 335-344.

Sullivan, P. J. Clark, J.J.J., Agardy, F. J., Rosenfeld, P.E. (2007). Toxic Legacy, Synthetic Toxins in the Food, Water, and Air in American Cities. Boston Massachusetts: Elsevier Publishing

Rosenfeld, P.E., and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash. Water Science and Technology. 49(9),171-178.

Rosenfeld P. E., J.J. Clark, I.H. (Mel) Suffet (2004). The Value of An Odor-Quality-Wheel Classification Scheme For The Urban Environment. *Water Environment Federation's Technical Exhibition and Conference (WEFTEC)* 2004. New Orleans, October 2-6, 2004.

Rosenfeld, P.E., and Suffet, I.H. (2004). Understanding Odorants Associated With Compost, Biomass Facilities, and the Land Application of Biosolids. *Water Science and Technology*. 49(9), 193-199.

Rosenfeld, P.E., and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash, Water Science and Technology, 49(9), 171-178.

Rosenfeld, P. E., Grey, M. A., Sellew, P. (2004). Measurement of Biosolids Odor and Odorant Emissions from Windrows, Static Pile and Biofilter. *Water Environment Research*. 76(4), 310-315.

Rosenfeld, P.E., Grey, M and Suffet, M. (2002). Compost Demonstration Project, Sacramento California Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Integrated Waste Management Board Public Affairs Office*, Publications Clearinghouse (MS–6), Sacramento, CA Publication #442-02-008.

Rosenfeld, P.E., and C.L. Henry. (2001). Characterization of odor emissions from three different biosolids. *Water Soil and Air Pollution*. 127(1-4), 173-191.

Rosenfeld, P.E., and Henry C. L., (2000). Wood ash control of odor emissions from biosolids application. *Journal of Environmental Quality*. 29, 1662-1668.

Rosenfeld, P.E., C.L. Henry and D. Bennett. (2001). Wastewater dewatering polymer affect on biosolids odor emissions and microbial activity. *Water Environment Research*. 73(4), 363-367.

Rosenfeld, P.E., and C.L. Henry. (2001). Activated Carbon and Wood Ash Sorption of Wastewater, Compost, and Biosolids Odorants. *Water Environment Research*, 73, 388-393.

Rosenfeld, P.E., and Henry C. L., (2001). High carbon wood ash effect on biosolids microbial activity and odor. *Water Environment Research*. 131(1-4), 247-262.

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Chollack, T. and P. Rosenfeld. (1998). Compost Amendment Handbook For Landscaping. Prepared for and distributed by the City of Redmond, Washington State.

Rosenfeld, P. E. (1992). The Mount Liamuiga Crater Trail. Heritage Magazine of St. Kitts, 3(2).

Rosenfeld, P. E. (1993). High School Biogas Project to Prevent Deforestation On St. Kitts. *Biomass Users Network*, 7(1).

Rosenfeld, P. E. (1998). Characterization, Quantification, and Control of Odor Emissions From Biosolids Application To Forest Soil. Doctoral Thesis. University of Washington College of Forest Resources.

Rosenfeld, P. E. (1994). Potential Utilization of Small Diameter Trees on Sierra County Public Land. Masters thesis reprinted by the Sierra County Economic Council. Sierra County, California.

Rosenfeld, P. E. (1991). How to Build a Small Rural Anaerobic Digester & Uses Of Biogas In The First And Third World. Bachelors Thesis. University of California.

Presentations:

Rosenfeld, P.E., "The science for Perfluorinated Chemicals (PFAS): What makes remediation so hard?" Law Seminars International, (May 9-10, 2018) 800 Fifth Avenue, Suite 101 Seattle, WA.

Rosenfeld, P.E., Sutherland, A; Hesse, R.; Zapata, A. (October 3-6, 2013). Air dispersion modeling of volatile organic emissions from multiple natural gas wells in Decatur, TX. 44th Western Regional Meeting, American Chemical Society. Lecture conducted from Santa Clara, CA.

Sok, H.L.; Waller, C.C.; Feng, L.; Gonzalez, J.; Sutherland, A.J.; Wisdom-Stack, T.; Sahai, R.K.; Hesse, R.C.; Rosenfeld, P.E. (June 20-23, 2010). Atrazine: A Persistent Pesticide in Urban Drinking Water. *Urban Environmental Pollution*. Lecture conducted from Boston, MA.

Feng, L.; Gonzalez, J.; Sok, H.L.; Sutherland, A.J.; Waller, C.C.; Wisdom-Stack, T.; Sahai, R.K.; La, M.; Hesse, R.C.; Rosenfeld, P.E. (June 20-23, 2010). Bringing Environmental Justice to East St. Louis, Illinois. *Urban Environmental Pollution*. Lecture conducted from Boston, MA.

Rosenfeld, P.E. (April 19-23, 2009). Perfluoroctanoic Acid (PFOA) and Perfluorocatane Sulfonate (PFOS) Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. 2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting, Lecture conducted from Tuscon, AZ.

Rosenfeld, P.E. (April 19-23, 2009). Cost to Filter Atrazine Contamination from Drinking Water in the United States" Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. 2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting. Lecture conducted from Tuscon, AZ.

Wu, C., Tam, L., Clark, J., Rosenfeld, P. (20-22 July, 2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. Brebbia, C.A. and Popov, V., eds., Air Pollution XVII: Proceedings of the Seventeenth International Conference on Modeling, Monitoring and Management of Air Pollution. Lecture conducted from Tallinn, Estonia.

Rosenfeld, P. E. (October 15-18, 2007). Moss Point Community Exposure To Contaminants From A Releasing Facility. *The 23rd Annual International Conferences on Soils Sediment and Water*. Platform lecture conducted from University of Massachusetts, Amherst MA.

Rosenfeld, P. E. (October 15-18, 2007). The Repeated Trespass of Tritium-Contaminated Water Into A Surrounding Community Form Repeated Waste Spills From A Nuclear Power Plant. The 23rd Annual International

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Conferences on Soils Sediment and Water. Platform lecture conducted from University of Massachusetts, Amherst MA

Rosenfeld, P. E. (October 15-18, 2007). Somerville Community Exposure To Contaminants From Wood Treatment Facility Emissions. The 23rd Annual International Conferences on Soils Sediment and Water. Lecture conducted from University of Massachusetts, Amherst MA.

Rosenfeld P. E. (March 2007). Production, Chemical Properties, Toxicology, & Treatment Case Studies of 1,2,3-Trichloropropane (TCP). *The Association for Environmental Health and Sciences (AEHS) Annual Meeting*. Lecture conducted from San Diego, CA.

Rosenfeld P. E. (March 2007). Blood and Attic Sampling for Dioxin/Furan, PAH, and Metal Exposure in Florala, Alabama. *The AEHS Annual Meeting*. Lecture conducted from San Diego, CA.

Hensley A.R., Scott, A., **Rosenfeld P.E.**, Clark, J.J.J. (August 21 – 25, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *The 26th International Symposium on Halogenated Persistent Organic Pollutants – DIOXIN2006.* Lecture conducted from Radisson SAS Scandinavia Hotel in Oslo Norway.

Hensley A.R., Scott, A., Rosenfeld P.E., Clark, J.J.J. (November 4-8, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *APHA 134 Annual Meeting & Exposition*. Lecture conducted from Boston Massachusetts.

Paul Rosenfeld Ph.D. (October 24-25, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. Mealey's C8/PFOA. Science, Risk & Litigation Conference. Lecture conducted from The Rittenhouse Hotel, Philadelphia, PA.

Paul Rosenfeld Ph.D. (September 19, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, *Toxicology and Remediation PEMA Emerging Contaminant Conference*. Lecture conducted from Hilton Hotel, Irvine California.

Paul Rosenfeld Ph.D. (September 19, 2005). Fate, Transport, Toxicity, And Persistence of 1,2,3-TCP. PEMA Emerging Contaminant Conference. Lecture conducted from Hilton Hotel in Irvine, California.

Paul Rosenfeld Ph.D. (September 26-27, 2005). Fate, Transport and Persistence of PDBEs. *Mealey's Groundwater Conference*. Lecture conducted from Ritz Carlton Hotel, Marina Del Ray, California.

Paul Rosenfeld Ph.D. (June 7-8, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. *International Society of Environmental Forensics: Focus On Emerging Contaminants*. Lecture conducted from Sheraton Oceanfront Hotel, Virginia Beach, Virginia.

Paul Rosenfeld Ph.D. (July 21-22, 2005). Fate Transport, Persistence and Toxicology of PFOA and Related Perfluorochemicals. 2005 National Groundwater Association Ground Water And Environmental Law Conference. Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

Paul Rosenfeld Ph.D. (July 21-22, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, Toxicology and Remediation. 2005 National Groundwater Association Ground Water and Environmental Law Conference. Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

Paul Rosenfeld, Ph.D. and James Clark Ph.D. and Rob Hesse R.G. (May 5-6, 2004). Tert-butyl Alcohol Liability and Toxicology, A National Problem and Unquantified Liability. *National Groundwater Association. Environmental Law Conference*. Lecture conducted from Congress Plaza Hotel, Chicago Illinois.

Paul Rosenfeld, Ph.D. (March 2004). Perchlorate Toxicology. Meeting of the American Groundwater Trust. Lecture conducted from Phoenix Arizona.

Paul E. Rosenfeld, Ph.D. Page 5 of 10 October 2021

Hagemann, M.F., **Paul Rosenfeld, Ph.D.** and Rob Hesse (2004). Perchlorate Contamination of the Colorado River. *Meeting of tribal representatives*. Lecture conducted from Parker, AZ.

Paul Rosenfeld, Ph.D. (April 7, 2004). A National Damage Assessment Model For PCE and Dry Cleaners. *Drycleaner Symposium. California Ground Water Association*. Lecture conducted from Radison Hotel, Sacramento, California.

Rosenfeld, P. E., Grey, M., (June 2003) Two stage biofilter for biosolids composting odor control. Seventh International In Situ And On Site Bioremediation Symposium Battelle Conference Orlando, FL.

Paul Rosenfeld, Ph.D. and James Clark Ph.D. (February 20-21, 2003) Understanding Historical Use, Chemical Properties, Toxicity and Regulatory Guidance of 1,4 Dioxane. *National Groundwater Association. Southwest Focus Conference. Water Supply and Emerging Contaminants.*. Lecture conducted from Hyatt Regency Phoenix Arizona.

Paul Rosenfeld, Ph.D. (February 6-7, 2003). Underground Storage Tank Litigation and Remediation. *California CUPA Forum*. Lecture conducted from Marriott Hotel, Anaheim California.

Paul Rosenfeld, Ph.D. (October 23, 2002) Underground Storage Tank Litigation and Remediation. *EPA Underground Storage Tank Roundtable*. Lecture conducted from Sacramento California.

Rosenfeld, P.E. and Suffet, M. (October 7- 10, 2002). Understanding Odor from Compost, Wastewater and Industrial Processes. Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association. Lecture conducted from Barcelona Spain.

Rosenfeld, P.E. and Suffet, M. (October 7-10, 2002). Using High Carbon Wood Ash to Control Compost Odor. Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association. Lecture conducted from Barcelona Spain.

Rosenfeld, P.E. and Grey, M. A. (September 22-24, 2002). Biocycle Composting For Coastal Sage Restoration. *Northwest Biosolids Management Association*. Lecture conducted from Vancouver Washington...

Rosenfeld, P.E. and Grey, M. A. (November 11-14, 2002). Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Soil Science Society Annual Conference*. Lecture conducted from Indianapolis, Maryland.

Rosenfeld. P.E. (September 16, 2000). Two stage biofilter for biosolids composting odor control. Water Environment Federation. Lecture conducted from Anaheim California.

Rosenfeld. P.E. (October 16, 2000). Wood ash and biofilter control of compost odor. *Biofest.* Lecture conducted from Ocean Shores, California.

Rosenfeld, P.E. (2000). Bioremediation Using Organic Soil Amendments. California Resource Recovery Association. Lecture conducted from Sacramento California.

Rosenfeld, P.E., C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. *Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings*. Lecture conducted from Bellevue Washington.

Rosenfeld, P.E., and C.L. Henry. (1999). An evaluation of ash incorporation with biosolids for odor reduction. *Soil Science Society of America*. Lecture conducted from Salt Lake City Utah.

Rosenfeld, P.E., C.L. Henry, R. Harrison. (1998). Comparison of Microbial Activity and Odor Emissions from Three Different Biosolids Applied to Forest Soil. *Brown and Caldwell*. Lecture conducted from Seattle Washington.

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Rosenfeld, P.E., C.L. Henry. (1998). Characterization, Quantification, and Control of Odor Emissions from Biosolids Application To Forest Soil. *Biofest*. Lecture conducted from Lake Chelan, Washington.

Rosenfeld, P.E, C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings. Lecture conducted from Bellevue Washington.

Rosenfeld, P.E., C.L. Henry, R. B. Harrison, and R. Dills. (1997). Comparison of Odor Emissions From Three Different Biosolids Applied to Forest Soil. *Soil Science Society of America*. Lecture conducted from Anaheim California

Teaching Experience:

UCLA Department of Environmental Health (Summer 2003 through 20010) Taught Environmental Health Science 100 to students, including undergrad, medical doctors, public health professionals and nurses. Course focused on the health effects of environmental contaminants.

National Ground Water Association, Successful Remediation Technologies. Custom Course in Sante Fe, New Mexico. May 21, 2002. Focused on fate and transport of fuel contaminants associated with underground storage tanks.

National Ground Water Association; Successful Remediation Technologies Course in Chicago Illinois. April 1, 2002. Focused on fate and transport of contaminants associated with Superfund and RCRA sites.

California Integrated Waste Management Board, April and May, 2001. Alternative Landfill Caps Seminar in San Diego, Ventura, and San Francisco. Focused on both prescriptive and innovative landfill cover design.

UCLA Department of Environmental Engineering, February 5, 2002. Seminar on Successful Remediation Technologies focusing on Groundwater Remediation.

University Of Washington, Soil Science Program, Teaching Assistant for several courses including: Soil Chemistry, Organic Soil Amendments, and Soil Stability.

U.C. Berkeley, Environmental Science Program Teaching Assistant for Environmental Science 10.

Academic Grants Awarded:

California Integrated Waste Management Board. \$41,000 grant awarded to UCLA Institute of the Environment. Goal: To investigate effect of high carbon wood ash on volatile organic emissions from compost. 2001.

Synagro Technologies, Corona California: \$10,000 grant awarded to San Diego State University. Goal: investigate effect of biosolids for restoration and remediation of degraded coastal sage soils. 2000.

King County, Department of Research and Technology, Washington State. \$100,000 grant awarded to University of Washington: Goal: To investigate odor emissions from biosolids application and the effect of polymers and ash on VOC emissions. 1998.

Northwest Biosolids Management Association, Washington State. \$20,000 grant awarded to investigate effect of polymers and ash on VOC emissions from biosolids. 1997.

James River Corporation, Oregon: \$10,000 grant was awarded to investigate the success of genetically engineered Poplar trees with resistance to round-up. 1996.

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United State Forest Service, Tahoe National Forest: \$15,000 grant was awarded to investigating fire ecology of the Tahoe National Forest. 1995.

Kellogg Foundation, Washington D.C. \$500 grant was awarded to construct a large anaerobic digester on St. Kitts in West Indies. 1993

Deposition and/or Trial Testimony:

In the Circuit Court Of The Twentieth Judicial Circuit, St Clair County, Illinois

Martha Custer et al., Plaintiff vs. Cerro Flow Products, Inc., Defendants

Case No.: No. 0i9-L-2295 Rosenfeld Deposition, 5-14-2021 Trial, October 8-4-2021

In the Circuit Court of Cook County Illinois

Joseph Rafferty, Plaintiff vs. Consolidated Rail Corporation and National Railroad Passenger Corporation

d/b/a AMTRAK.

Case No.: No. 18-L-6845 Rosenfeld Deposition, 6-28-2021

In the United States District Court For the Northern District of Illinois

Theresa Romcoe, Plaintiff vs. Northeast Illinois Regional Commuter Railroad Corporation d/b/a METRA

Rail, Defendants

Case No.: No. 17-cv-8517 Rosenfeld Deposition, 5-25-2021

In the Superior Court of the State of Arizona In and For the Cunty of Maricopa

Mary Tryon et al., Plaintiff vs. The City of Pheonix v. Cox Cactus Farm, L.L.C., Utah Shelter Systems, Inc.

Case Number CV20127-094749 Rosenfeld Deposition: 5-7-2021

In the United States District Court for the Eastern District of Texas Beaumont Division

Robinson, Jeremy et al Plaintiffs, vs. CNA Insurance Company et al.

Case Number 1:17-cv-000508 Rosenfeld Deposition: 3-25-2021

In the Superior Court of the State of California, County of San Bernardino

Gary Garner, Personal Representative for the Estate of Melvin Garner vs. BNSF Railway Company.

Case No. 1720288

Rosenfeld Deposition 2-23-2021

In the Superior Court of the State of California, County of Los Angeles, Spring Street Courthouse

Benny M Rodriguez vs. Union Pacific Railroad, A Corporation, et al.

Case No. 18STCV01162

Rosenfeld Deposition 12-23-2020

In the Circuit Court of Jackson County, Missouri

Karen Cornwell, Plaintiff, vs. Marathon Petroleum, LP, Defendant.

Case No.: 1716-CV10006

Rosenfeld Deposition. 8-30-2019

In the United States District Court For The District of New Jersey

Duarte et al, Plaintiffs, vs. United States Metals Refining Company et. al. Defendant.

Case No.: 2:17-cv-01624-ES-SCM Rosenfeld Deposition. 6-7-2019

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In the United States District Court of Southern District of Texas Galveston Division

M/T Carla Maersk, *Plaintiffs*, vs. Conti 168., Schiffahrts-GMBH & Co. Bulker KG MS "Conti Perdido" Defendant.

Case No.: 3:15-CV-00106 consolidated with 3:15-CV-00237

Rosenfeld Deposition. 5-9-2019

In The Superior Court of the State of California In And For The County Of Los Angeles - Santa Monica

Carole-Taddeo-Bates et al., vs. Ifran Khan et al., Defendants

Case No.: No. BC615636 Rosenfeld Deposition, 1-26-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica

The San Gabriel Valley Council of Governments et al. vs El Adobe Apts. Inc. et al., Defendants

Case No.: No. BC646857

Rosenfeld Deposition, 10-6-2018; Trial 3-7-19

In United States District Court For The District of Colorado

Bells et al. Plaintiff vs. The 3M Company et al., Defendants

Case No.: 1:16-cv-02531-RBJ

Rosenfeld Deposition, 3-15-2018 and 4-3-2018

In The District Court Of Regan County, Texas, 112th Judicial District

Phillip Bales et al., Plaintiff vs. Dow Agrosciences, LLC, et al., Defendants

Cause No.: 1923

Rosenfeld Deposition, 11-17-2017

In The Superior Court of the State of California In And For The County Of Contra Costa

Simons et al., Plaintiffs vs. Chevron Corporation, et al., Defendants

Cause No C12-01481

Rosenfeld Deposition, 11-20-2017

In The Circuit Court Of The Twentieth Judicial Circuit, St Clair County, Illinois

Martha Custer et al., Plaintiff vs. Cerro Flow Products, Inc., Defendants

Case No.: No. 0i9-L-2295

Rosenfeld Deposition, 8-23-2017

In United States District Court For The Southern District of Mississippi

Guy Manuel vs. The BP Exploration et al., Defendants

Case: No 1:19-cv-00315-RHW Rosenfeld Deposition, 4-22-2020

In The Superior Court of the State of California, For The County of Los Angeles

Warrn Gilbert and Penny Gilber, Plaintiff vs. BMW of North America LLC

Case No.: LC102019 (c/w BC582154)

Rosenfeld Deposition, 8-16-2017, Trail 8-28-2018

In the Northern District Court of Mississippi, Greenville Division

Brenda J. Cooper, et al., Plaintiffs, vs. Meritor Inc., et al., Defendants

Case Number: 4:16-cv-52-DMB-JVM

Rosenfeld Deposition: July 2017

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In The Superior Court of the State of Washington, County of Snohomish

Michael Davis and Julie Davis et al., Plaintiff vs. Cedar Grove Composting Inc., Defendants

Case No.: No. 13-2-03987-5

Rosenfeld Deposition, February 2017

Trial, March 2017

In The Superior Court of the State of California, County of Alameda

Charles Spain., Plaintiff vs. Thermo Fisher Scientific, et al., Defendants

Case No.: RG14711115

Rosenfeld Deposition, September 2015

In The Iowa District Court In And For Poweshiek County

Russell D. Winburn, et al., Plaintiffs vs. Doug Hoksbergen, et al., Defendants

Case No.: LALA002187

Rosenfeld Deposition, August 2015

In The Circuit Court of Ohio County, West Virginia

Robert Andrews, et al. v. Antero, et al. Civil Action N0. 14-C-30000 Rosenfeld Deposition, June 2015

In The Iowa District Court For Muscatine County

Laurie Freeman et. al. Plaintiffs vs. Grain Processing Corporation, Defendant

Case No 4980

Rosenfeld Deposition: May 2015

In the Circuit Court of the 17th Judicial Circuit, in and For Broward County, Florida

Walter Hinton, et. al. Plaintiff, vs. City of Fort Lauderdale, Florida, a Municipality, Defendant.

Case Number CACE07030358 (26) Rosenfeld Deposition: December 2014

In the County Court of Dallas County Texas

Lisa Parr et al, Plaintiff, vs. Aruba et al, Defendant.

Case Number cc-11-01650-E

Rosenfeld Deposition: March and September 2013

Rosenfeld Trial: April 2014

In the Court of Common Pleas of Tuscarawas County Ohio

John Michael Abicht, et al., Plaintiffs, vs. Republic Services, Inc., et al., Defendants

Case Number: 2008 CT 10 0741 (Cons. w/ 2009 CV 10 0987)

Rosenfeld Deposition: October 2012

In the United States District Court for the Middle District of Alabama, Northern Division

James K. Benefield, et al., *Plaintiffs*, vs. International Paper Company, *Defendant*.

Civil Action Number 2:09-cv-232-WHA-TFM Rosenfeld Deposition: July 2010, June 2011

In the Circuit Court of Jefferson County Alabama

Jaeanette Moss Anthony, et al., Plaintiffs, vs. Drummond Company Inc., et al., Defendants

Civil Action No. CV 2008-2076

Rosenfeld Deposition: September 2010

In the United States District Court, Western District Lafayette Division

Ackle et al., Plaintiffs, vs. Citgo Petroleum Corporation, et al., Defendants.

Case Number 2:07CV1052 Rosenfeld Deposition: July 2009

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EXHIBIT B

Shawn Smallwood, PhD 3108 Finch Street Davis, CA 95616

Attn: Mariela Moran, Planner II Imperial County Planning & Development Services Department 801 Main Street El Centro, CA 92243

10 February 2022

RE: Ormat Brawley Solar Project

Dear Ms. Moran,

I write to comment on the Draft Environmental Impact Report (DEIR) prepared for the proposed Ormat Brawley Solar Project (County of Imperial 2021), which I understand would convert 227 acres of open space to 40 MW of utility-scale photo-voltaic (PV) solar panels with a 92/12 kV substation, 40 MW battery storage system (BESS), an 1.8-mile-long double circuit 13.8 and 92 kV generation tie-line (gen-tie) on 66-foot-high poles, fiberoptic line and microwave tower, inverters, transformers, underground electrical cables, and access roads. The DEIR mentions a 6-foot-tall perimeter security fence, but not its length; I estimate it at 9.26 km. The DEIR specified no time limit to the conditional use permit, but it frequently states the assumption that utility-scale solar equipment lasts about 30 years. My understanding is that more recently built projects can expect to operate 40 years.

F B-1

My qualifications for preparing expert comments are the following. I hold a Ph.D. degree in Ecology from University of California at Davis, where I also worked as a post-graduate researcher in the Department of Agronomy and Range Sciences. I study animal density and distribution, habitat selection, interactions between wildlife and human infrastructure and activities, and conservation of rare and endangered species. I authored numerous papers on special-status species issues. I served as Chair of the Conservation Affairs Committee for The Wildlife Society – Western Section. I am a member of The Wildlife Society and the Raptor Research Foundation, and I've lectured part-time at California State University, Sacramento. I was Associate Editor of wildlife biology's premier scientific journal, The Journal of Wildlife Management, as well as of Biological Conservation, and I was on the Editorial Board of Environmental Management. I have performed wildlife surveys in California for thirty-six years, including at many proposed project sites. My CV is attached.

F B-2

SITE VISIT

I visited the proposed project site from 14:30 until 17:30 hours on 3 February 2022 and from 06:52 until 09:42 hours on 4 February 2022. Conditions were clear and windless on both days, and 51° F on the 3rd, and 40° F on the 4th. I visually scanned the site with the aid of binoculars for 5.83 hours. The site proposed for the project had been in alfalfa and hay production. Trees were scattered throughout the project area, and dense rows of Atriplex and other tall shrubs and short trees bordered either side of the railroad

F B-3

1

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tracks (Photos 1 and 2), where many birds resided. The City of Brawley Wastewater Treatment Plant borders the project to the west. On the north side of the Treatment Plant and immediately west of the proposed solar project is a sign that announces habitat restoration in progress (Photo 3). The DEIR, however, makes no mention of this restoration nor whether and how the proposed project might affect it.

Shawu Smallsvood

Photos 1 and 2. Views of Atriplex and other trees and shrubs on either side of the railroad tracks within the boundaries of the project site, 3-4 February 2022. In the top photo, a greater roadrunner is visible on the tracks. In the bottom photo, a merlin is perched on the powerlines.

2

F B-3 cont'd

Photo 3.
Habitat
restoration
adjacent to the
project site, on
the west side.
The DEIR does
not mention this
restoration nor
what the project
would mean to
it.



F B-3 cont'd

I detected 52 species of vertebrate wildlife, including up to 13 special-status species (Table 1). I observed thousands of blackbirds of multiple species (Photos 4-8), western meadowlarks (Photo 9), American kestrels and northern harriers (Photos 10 and 11), black-tailed gnatcatchers and verdin (Photos 12 and 13), Abert's towhees (Photo 14), least sandpipers and killdeer (Photos 15 and 16), black phoebes and yellow-rumped warblers (Photos 17 and 18), Gambel's quail (Photo 19), great-tailed grackles (Photo 20), cattle egrets and long-billed curlew (Photos 21 and 22), song sparrows and savannah sparrows (Photos 23 and 24), white-crowned sparrows (Photo 25), tracks of coyotes and raccoons (Photos 26 and 27), many bird nests (Photos 28 and 29), and many burrows constructed by small mammals (Photo 30). I saw many members of additional species whose photos I was unable to capture in sufficient focus for sharing. The site is rich in wildlife species, and is heavily trafficked by both terrestrial and volant animals.

F B-4

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3

Table 1. Species of wildlife I observed during 5.83 hours of survey on 3-4 February 2022.

Common name	Species name	Status ¹	Notes
Mallard	Anas platyrhynchos		Flyover
Gamble's quail	Callipepla gambelii		Shrubs along RR tracks
Common ground dove	Columbina passerina		Flyover
White-winged dove	Zenaida asiatica		Flyover
Mourning dove	Zenaida macroura		Many
Greater roadrunner	Geococcyx californianus		Pair on RR tracks
Killdeer	Charadrius vociferus		On site
Long-billed curlew	Numenius americanus	TWL	Flyover
Least sandpiper	Calidris minutilla		Wet pools along RR tracks
California gull	Larus californicus	BCC, TWL	Flyover
Ring-billed gull	Larus delawarensis		Flyover
Great egret	Ardea alba		Flyover
Snowy egret	Egretta thula		Flyover
Cattle egret	Bubulcus ibis	Non-native	Many
White-faced ibis	Pledogis chihi	TWL	Flyover
Northern harrier	Circus hudsonicus	BCC, SSC3, BOP	at least 3
Red-tailed hawk	Buteo jamaicensis	BOP	at least 3
Belted kingfisher	Ceryle alcyon		Flyover
Northern flicker	Colaptes auratus		Call
American kestrel	Falco sparverius	BOP	2 pair
Merlin	Falco columbarius	TWL	Dusk
Western kingbird	Tyrannus verticalis		Foraged on site
Say's phoebe	Sayornis saya		Pair
Black phoebe	Sayornis nigricans		Multiple
Warbling vireo	Vireo gilvus		Shrubs along RR tracks
Violet-green swallow	Tachycineta thalassina		at dusk
Verdin	Auriparus flaviceps	BCC	Shrubs along RR tracks
Black-tailed gnatcatcher	Polioptila nigriceps	TWL	Multiple pairs in shrubs along RR tracks
Northern mockingbird	Mimus polyglottos		At least 2
European starling	Sturnus vulgaris	Non-native	Mixed with blackbirds

F B-4 cont'd

4

Common name	Species name	Status ¹	Notes
American pipit	Anthus rubescens		Many
House finch	Haemorphous mexicanus		along road
Lesser goldfinch	Spinus psaltria		Shrubs along RR tracks
White-crowned Sparrow	Zonotrichia leucophrys		Many
Large-billed savannah sparrow	Passerculus sandwichensis rostratus	SSC2	Many
Song sparrow	Melospiza melodia		Many
Lincoln's sparrow	Melospiza lincolnii		Shrubs along RR tracks
Abert's towhee	Melozone aberti		foraging along RR tracks
Yellow-headed blackbird	Xanthocephalus xanthocephalus	SSC3	Hundreds
Western meadowlark	Sturnella neglecta		On site
Red-winged blackbird	Agelaius phoeniceus		Hundreds
Tricolored blackbird ²	Agelaius tricolor	CT, BCC	uncertain; in mixed flock
Brown-headed cowbird	Molothrus ater		Mixed with blackbirds
Great-tailed grackle	Quiscalus mexicanus		along road
Yellow warbler	Setophaga petechia	BCC, SSC2	Shrubs along RR tracks
Yellow-rumped warbler	Dendroica coronata		Many
Striped skunk	Mephitis mephitis		Tracks
Raccoon	Procyon lotor		Tracks
Coyote	Canis latrans		Tracks and vocal
Desert cottontail	Sylvilagus auduboni		Tracks
Kangaroo rat	Dipodomys		along soil berms
Ground squirrel	Otospermophilus beecheyi		along soil berms

¹ Listed as BCC = U.S. Fish and Wildlife Service Bird of Conservation Concern, SSC2 and SSC3 = California Bird Species of Special Concern priority 2 (Shuford and Gardali 2008), TWL = Taxa to Watch List (Shuford and Gardali 2008), and BOP = California Fish and Game Code 3503.5 (Birds of Prey).

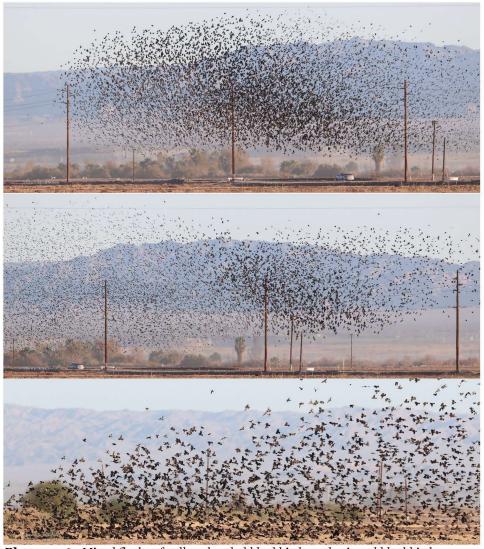
2 Uncertain of detection due to blurriness of subjects in photos.

F B-4 cont'd

5

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F B-4 cont'd



Photos 4-6. Mixed flocks of yellow-headed blackbirds, red-winged blackbirds, brown-headed cowbirds, European starlings and possibly tricolored blackbirds perform murmurations each time they were approached by a northern harrier at the project site, 4 February 2022.

6

Photo 7. Mixed flock of yellow-headed blackbirds, red-winged blackbirds, brown-headed cowbirds, European starlings and possibly tricolored blackbirds over the project site, 3-4 February 2022.



Photos 8 and 9. Yellow-headed blackbird with brown-headed cowbirds (left) and western meadowlark (right) at the project site, 4 February 2022.

F B-4 cont'd

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Photos 10 and 11. American kestrel (left) and northern harrier (right) at the project site, 3-4 February 2022.



Photos 12 and 13. Black-tailed gnatcatcher (left) and verdin (right) at the project site, 3-4 February 2022.

F B-4 cont'd

8



Photo 14. Abert's towhee forages alongside a white-crowned sparrow on the railroad tracks that bisect the project site, 3 February 2022.



Photos 15 and 16. Least sandpiper (left) and killdeer (right) on the project site, 4 February 2022.

9

F B-4 cont'd

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Photos 17 and 18. Black phoebe (left) and yellow-rumped warbler (right), 3-4 February 2022.



Photo 19. Gambel's quail cross the railroad tracks on site, 3 February 2022.

F B-4 cont'd



Photo 20. Great-tailed grackle on the project site, 4 February 2022.



Photos 21 and 22. Cattle egrets (left) and long-billed curlew (right) fly over the site, 3-4 February 2022.

11

F B-4 cont'd

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Photos 23 and 24. Song sparrow (left) and savannah sparrow (right) on the project site, 3-4 February 2022.

Photo 25. White-crowned sparrow at dusk on the project site, 3 February 2022.



F B-4 cont'd

12



Photos 26 and 27. Coyote (left) and raccoon (right) tracks on the project site, 3 February 2022.



Photos 28 and 29. Two of many bird nests on the project site, 3-4 February 2022.

F B-4 cont'd

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Photo 30. One of many mammal burrows on the project site, 3 February 2022.



F B-4 cont'd

CURRENT ENVIRONMENTAL SETTING

The DEIR (page 3.1-1) reports, "Changes that would result from the project were evaluated relative to existing environmental conditions within the project site..." Thus, it was critical to the impacts analysis to accurately characterize the current environmental setting. The first step in analysis of potential project impacts to biological resources is to accurately characterize the existing environmental setting, including the species that use the site, their relative abundances, how they use the site, key ecological relationships, and known and ongoing threats to those species with special status. A reasonably accurate characterization of the environmental setting can provide the baseline against which to analyze project impacts. Methods to achieve this first step should include surveys of the site for biological resources and reviews of literature, databases and local experts for documented occurrences of special-status species. In this case, these essential steps remain incomplete. Herein I provide additional characterization of the wildlife community as a component of the current environmental setting, including the identification of special-status species likely to use the site at one time or another.

F B-5

14

Over 17.3 person-hours of survey on 22 October 2020, Chambers Group (2021) detected 40 species of vertebrate wildlife (they reportedly detected 39 species, but I counted 40), including 22 of the species I detected and 18 that I did not (Table 2). Chambers Group detected an additional 7 special-status species that I did not detect (Table 2), and only one of which did Chambers Group identify as special-status species – loggerhead shrike. The totals between our two survey efforts were 70 species of vertebrate wildlife and 20 documented occurrences of special-status species on the project site.

Table 2. Additional species of wildlife I did not observe but were detected by Chambers Group which during 17 3 person-hours of survey on 22 October 2020

Common name	Species name	Status ¹
Clark's grebe	Aechmophorus clarkii	BCC
Double-crested cormorant	Phalacrocorax auritus	TWL
Turkey vulture	Cathartes aura	BOP
American coot	Fulica americana	
Black-necked stilt	Himantopus mexicanus	
Willet	Tringa semipalmata	BCC
Short-billed dowitcher	Limnodromus griseus	BCC
Long-billed dowitcher	Limnodromus scolopaceus	
Eurasian collared-dove	Streptopelia decaocto	Non-native
Vermillion flycatcher	Pyrocephalus rubinus	SSC2
Barn swallow	Hirundo rustica	
Rock wren	Salpinctes obsoletus	
House wren	Troglodytes aedon	
Blue-gray gnatcatcher	Polioptila caerulea	
Loggerhead shrike	Lanius ludovicianus	BCC, SSC2
Black-throated gray warbler	Setophaga nigrescens	
Common yellowthroat	Geothlypis trichas	
Western fence lizard	Sceloporus occidentalis	

¹ Listed as BCC = U.S. Fish and Wildlife Service Bird of Conservation Concern, SSC₂ = California Bird Species of Special Concern priority 2 (Shuford and Gardali 2008), TWL = Taxa to Watch List (Shuford and Gardali 2008), and BOP = California Fish and Game Code 3503.5 (Birds of Prey).

Chambers Group's detections of 40 species of vertebrate wildlife (2.3 species detections per person-hour), and my detections of 52 species of vertebrate wildlife (8.9 species detections per person-hour) need to be interpreted within the contexts of our respective survey efforts. No matter who performs a survey, the results of a reconnaissance-level survey qualify as thin empirical foundation for characterizing the environmental setting of any site, including one proposed for a project. Such surveys can serve only as a starting point toward characterization of a site's wildlife community.

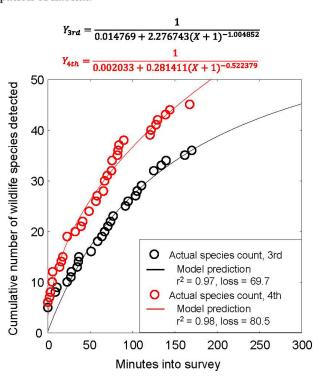
Just as with Chambers Group's surveys, there were only so many species I was likely to detect within the short time I had available to perform visual-scan surveys on 3-4 February 2022. As would be the case for any reconnaissance-level survey, the time I could commit to my survey was grossly short of the time needed to sufficiently inventory the species that use the site. Observers are imperfect at detecting all the species that

F B-5 cont'd

F B-6

0.2-318 | January 2023 County of Imperial occur within their surveyed space, and not all of the species that would occur in the surveyed space would occur there during the period of the observer's survey. Further contributing to the observer's imperfection, observers typically quit the survey before all the species that could be detected are actually detected. Surveys are ended to balance results against cost or because nightfall or the heat of the afternoon vastly diminish the likelihood of additional species detections. However, one can model the pattern in species detections during a survey as a means to estimate the number of species that used the site but were not detected during the survey. To support such a modeling effort, the observer needs to record the times into the survey when each species was first detected. Cumulative first detections increase with increasing survey time, but eventually with diminishing returns (Figure 1). (Minutes into the survey can be thought of as person-minutes, thereby constraining model predictions to the environmental conditions experienced during the time period of the survey.) This modeling approach is useful for more realistically representing the species richness of the site at the time of the survey, but it cannot represent the species richness throughout the year or across multiple years because many species are seasonal or even multi-annual in their movement patterns and occupation of habitat.

Figure 1. Actual and predicted relationships between the number of vertebrate wildlife species detected and the elapsed survey time based on my visual-scan surveys on 3-4 February 2022. Note that the relationships would differ if the surveys were based on another method or during another season. Also note that the cumulative number of vertebrate species across all methods, times of day, and seasons would increase substantially.



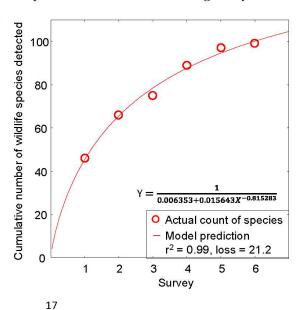
F B-6 cont'd

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I could have detected many more species than predicted had I also performed surveys at different times of day/night to detect nocturnal and crepuscular species with appropriate methods and technology, or surveys in different seasons and years to detect migrants and species with multi-annual cycles of abundance. My reconnaissance-level surveys inform me that the site is richer in wildlife than the 70 species documented there so far, but also that the environmental setting of the project remains insufficiently characterized as foundation for analysis of impacts to special-status species. A more realistic representation of species richness at the site could be obtained by simply repeating visual-scan surveys on various dates through the year.

As a case in point, I repeated visual-scan surveys 6 times over the period of one year at a proposed project site near Sacramento, California. Survey outcomes ranged 40 to 67 species per survey, but a least-squares regression model that I fit to the cumulative number of species detections predicted that 157 species of vertebrate wildlife would eventually be detected by continuing to repeat the visual-scan surveys (Figure 2). Repeated surveys achieved diminishing returns, but they were necessary to document the occurrences of the scarcer and more cryptic species. Given the example illustrated in Figure 2, and assuming the pattern of survey returns is robustly represented by Figure 2, the 36 to 45 species I detected after surveys on the $3^{\rm rd}$ and $4^{\rm th}$ of February at the project site likely represented 29% of the species likely to be detected after six visual-scan surveys. With five more repeat surveys, I would likely detect $^{36}/_{0.29} = 124$ to $^{45}/_{0.29} = 155$ species of vertebrate wildlife at the site. But these predictions are based on one site where I measured the outcomes of repeat surveys. It would help to know the robustness of the pattern of cumulative species detections with increasing survey time.

Figure 2. Cumulative number of species detected as a function of the number of visual-scan surveys performed through one year at one site near Sacramento, California.



F B-7

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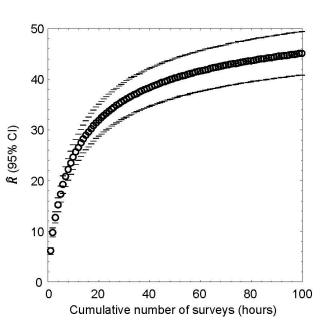
F B-7 cont'd

As part of my research, I completed a much larger survey effort across 167 km² of annual grasslands of the Altamont Pass Wind Resource Area, where from 2015 through 2019, I performed 721 1-hour visual-scan surveys, or 721 hours of surveys, at 46 stations. I used binoculars and otherwise the methods were the same as the methods I use for surveys at proposed project sites. At each of the 46 survey stations, I tallied new species detected with each sequential survey at that station, and then related the cumulative species detected to the hours (number of surveys, as each survey lasted 1 hour) used to accumulate my counts of species detected. I used combined quadratic and simplex methods of estimation in Statistica to estimate least-squares, best-fit nonlinear models of cumulative species detected regressed on hours of survey (number of surveys) at the station: $\hat{R} = \frac{1}{1/a + b \times (Hours)^c}$, where \hat{R} represented cumulative species richness detected. Coefficients of determination of model-fit ranged 0.88 to 1.00, with a mean of 0.97 (95% CI: 0.96, 0.98). I projected the predictions of each model to thousands of hours to find predicted asymptotes of wildlife species richness. The mean model-predicted asymptote of species richness was 57 after 11,857 hours of visual-scan surveys. I also averaged model predictions of species richness at each incremental increase of number of surveys, i.e., number of hours (Figure 3). On average I detected 19 species over the first 6 hours of surveys in the Altamont Pass, which composed 33.33 % of the total predicted species I would detect with a much larger survey effort. Note that this value is close to the 29% value I obtained from the Sacramento project site that I used as my first example in Figure 2. Given the example illustrated in Figure 3, and assuming the pattern of survey results is much more robustly represented by Figure 3 than it was in Figure 2, the 52 species I detected after my 5.83 hours of survey at the project site likely represented 33.33% of the species to be detected after many more visual-scan surveys. With many more repeat surveys, I would likely detect $^{52}/_{0.3333} = 156$ species of vertebrate wildlife at the site. Given the much greater robustness of the model derived from the Altamont Pass, it is 156 species of vertebrate wildlife that I predict would be detected at the site after repeat diurnal visual-scan surveys throughout a year.

There is no question that a larger survey effort would result in a longer list of species documented to use the project site, thereby changing our understanding of the current environmental setting. But still unknown are which species have yet to be detected, how many of the yet-to-be-detected species are special-status species, and how many are listed species. The likelihood of detecting special-status species is typically lower than that of more common species. This difference can be explained by the fact that special-status species tend to be rarer and thus less detectable than common species. Special-status species also tend to be more cryptic, fossorial, or active during nocturnal periods when reconnaissance surveys are not performed. Another useful relationship from careful recording of species detections and subsequent comparative analysis is the probability of detection of listed species as a function of an increasing number of vertebrate wildlife species detected (Figure 4). (Note that listed species number fewer than special-status species, which are inclusive of listed species. Also note that I include California Fully Protected species and federal Candidate species as listed species.)

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Figure 3. Mean (95% CI) predicted wildlife species richness, \hat{R} , as a nonlinear function of hour-long survey increments across 46 visual-scan survey stations across the Altamont Pass Wind Resource Area, Alameda and Contra Costa Counties, 2015–2019.



Candidate, Threatened or Endangered Species e-2.621955+0.068131N Probability of detecting 2 Fully Protected, Candidate, Threatened or Endangered Species e-3.964717+0.060349N 1 + e^{-2.621955+0.068131}N Probability of detecting Fully Protected 8.0 0.8 = 95% CI = 95% CI 0.6 0.6 0.4 0.2 0.2 0.0 30 40 60 70 30 40 0 50 0 Number of species detected Number of species detected

Figure 4. Probability of detecting ≥ 1 Candidate, Threatened or Endangered Species of wildlife listed under California or federal Endangered Species Acts, based on survey outcomes logit-regressed on the number of wildlife species I detected during 152 site visits in California. The dashed vertical line represents the number of species detected by Chambers Group and the solid vertical line represents the number I detected.

F B-7 cont'd

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As was demonstrated in Figures 1 – 3, the number of species detected is largely a function of survey effort. Greater survey effort also increases the likelihood that listed species will be detected (which is the first tenet of detection surveys for special-status species). Based on the outcomes of 152 previous surveys that I performed at sites of proposed projects, my survey effort at the project site carried an 72% chance of detecting 1 listed species and a 30.5% chance of detecting 2 listed species, whereas the survey effort of Chambers Group, which resulted in fewer species detections, carried a 52.5% chance of detecting 1 listed species and a 18.5% chance of detecting 2 listed species. Chambers Group (2020) did not detect a listed species, and I think I did (tricolored blackbird). With another survey or two, I likely would have detected at least 2 listed species, considering Chambers Group's slower rate of species detections, Chambers Group would likely have required many surveys to detect a listed species. In summary, 1 or 2 reconnaissance-level surveys are incapable of detecting enough of the wildlife species that occur at a site to realistically characterize the site's wildlife community. This context bears on my comments regarding potential project impacts to biological resources.

F B-8

Chambers Group (2020) explained that their survey was intended "to identify the potential for occurrence of sensitive species, vegetation communities, or habitats that could support sensitive wildlife species." As attested by their provision of a list of species detected during their survey, Chambers Group obviously regarded species detections on site as affirmations of the site's habitat suitability per the species that were detected. I concur with this opinion. After all, habitat is defined by a species' use of the environment (Hall et al. 1997, Morrison et al. 1998, Krausman 2016). Species occurrences offer the most reliable inference into what parts of the environment compose the species' habitat. Assessing habitat "suitability" without the benefit of a species' occurrence data, however, is fraught with uncertainty and vulnerable to errors on the wrong side of caution, i.e., contrary to the precautionary principle in risk assessments directed toward rare or precious resources in the face of uncertainty (National Research Council 1986). The analyst should more often assume presence of each conceivable species because, informed only by a reconnaissance-level survey, insufficient effort was made to prove absence. To prove absence, protocol-level detection surveys were formulated by natural resource agencies and species' experts.

F B-9

As a case in point, Chambers Group (2020) reported that yellow warbler is absent from the site. Their absence determination was wrong. I saw yellow warbler on the site. An absence determination should not have been based on someone's notion of what qualifies as suitable habitat of yellow warbler. What I saw of the site were rows of tall, densely clumped shrubs growing near the New River, which was a setting where I would not be surprised to find yellow warbler. In such a setting, I would not be satisfied with an absence determination until an appropriate number of detection surveys with negative outcomes had been completed by qualified experts on yellow warbler. But no need of detection surveys in this case because I saw yellow warbler without much effort.

F B-10

Chambers Group reports crissal thrasher, Gila woodpecker, gull-billed tern, western snowy plover, and Yuma Ridgway's rail absent from the site, but eBird records of these 5 F B-11

special-status species occur within 1.5 miles of the site. In my experience, a species of wildlife documented to have occurred within 1.5 miles of a site stands a good chance of also using the site at one time or another or even more frequently. Furthermore, the nature of the risk from the proposed project warrants consideration of the atmospheric portion of habitat of these species. Birds collide with solar PV panels, the collector lines and gen-tie, and with the perimeter security fence (Smallwood 2020, in press). Yuma Ridgway rail, western snowy plover, crissal thrasher, and yellow warbler are known to have collided and died on solar PV projects, along with many other birds that include portions of the aerosphere as critical elements of their habitat (Table 3). In rendering determinations of occurrence likelihoods, it seems that Chambers Group did not consider the aerosphere as part of avian habitat, which is strange considering that birds fly.

F B-11 cont'd

No use was made of richly informative data sets on wildlife occurrences such as eBird. Had available information been appropriately used, and had the aerial portion of wildlife habitat been considered, the list of special-status species potentially affected by the project would look more like that in Table 3. Available evidence supports the conclusion that up to 88 special-status species of wildlife likely occur at the project site at one time or another, most of them flying across the site for various reasons. Twelve of the species in Table 3 are listed as threatened or endangered or California Fully Protected. Of the 88 special-status species in Table 3, 20 (22.7%) have been confirmed on site by survey visits, 52 (59.1% have been documented within 1.5 miles of the site ('Very close'), 1 was documented within 1.5 and 3 miles of the site ('Nearby'), and another 15 (17%) were documented within 30 to 50 miles or so ('In region'). The available data that Chambers Group did not use reveal the site as a hub of occurrences of special-status species of wildlife. And importantly, most of these species are volant, which puts them at higher risk of colliding with project facilities. In fact, 35 of the species in Table 3 have been documented as fatalities caused by utility-scale solar PV projects.

F B-12

Chambers Group (2020), and thus County of Imperial (2021), relies on California Natural Diversity Data Base (CNDDB) to determine occurrence likelihoods of specialstatus species of wildlife at the site. Specifically, Chambers Group ranks species for occurrence likelihood based on CNDDB records within distance thresholds of the site. This was an inappropriate use of CNDDB, which is suitable for confirming presence of a species, but not for supporting absence determinations. CNDDB is not based on scientific sampling, and is dependent on property access and investigator reporting. CNDDB appropriately posts the disclaimer, "We work very hard to keep the CNDDB and the Spotted Owl Database as current and up-to-date as possible given our capabilities and resources. However, we cannot and do not portray the CNDDB as an exhaustive and comprehensive inventory of all rare species and natural communities statewide. Field verification for the presence or absence of sensitive species will always be an important obligation of our customers. Likewise, your contribution of data to the CNDDB is equally important to the maintenance of the CNDDB. ..." In short, CNDDB cannot possibly inform of which species occupy a site unless earlier detection surveys were performed and the results transmitted to CNDDB.

F B-13

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Table 3. Occurrence likelihoods of wildlife species at the project site according to County of Imperial (2021) ("Imperial") and myself. eBird records are those occurring on or near the project site, and represent my conclusion that the species probably occurs at the site at various times. The right column identifies those species with documented collision fatalities along fences or powerlines of utility-scale solar projects that were monitored for fatalities.

Occurrence likelihood Data bases, site Known collisions Common name, Species name Status¹ **Imperial** visits Very close Brant, Branta bernicla SSC₂ Yes SSC₃ Redhead, Aythya americana Very close Yes Clark's grebe, Aechmophorus clarki BCC On site Western grebe, Aechmophorus occidentalis BCC Very close Yes FT, CE, BCC Yellow-billed cuckoo, Coccyzus americanus In region Yes Vaux's swift, Chaetura vauxi SSC2 Very close Costa's hummingbird, Calypte costae BCC Very close Rufous hummingbird, Selasphorus rufus BCC Very close Yuma Ridgway's rail, Rallus longirostris yumanensis FE, CT Very close Yes Greater sandhill crane, Grus canadensis tabida CT Very close BCC American avocet, Recurvirostra americana Very close Yes FT, BCC Western snowy plover, Charadrius alexandrinus nivosus Very close Yes Mountain plover, Charadrius montanus BCC, SSC2 Very close Red knot, Calidris canutus BCC Very close Long-billed curlew, Numenius americanus BCC, TWL On site Whimbrel, Numenius phaeopus BCC Very close Short-billed dowitcher, Limnodromus griseus BCC On site Marbled godwit, Limosa fedua BCC Very close Willet, Tringa semipalmata BCC On site Caspian tern, Hydroprogne caspia TWL Very close Gull-billed tern, Gelochelidon nilotica BCC Very close Black skimmer, Rynchops niger BCC Very close BCC, TWL California gull, Larus californicus On site Yes Western gull, Larus occidentalis BCC Very close

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		Occurr	Occurrence likelihood	
Common name, Species name	Status ¹	Imperial	Data bases, site visits	Known collisions
Heermann's gull, Larus heermanni	BCC		Very close	
Yellow-footed gull, Larus livens	BCC		Very close	
Common loon, Gavia immer	SSC		Very close	Yes
Double-crested cormorant, Phalacrocorax auritus	TWL		On site	Yes
American white pelican, Pelacanus erythrorhynchos	SSC1		Very close	
Brown pelican, Pelacanus occicentalis californicus	CFP		Very close	Yes
Least bittern, Ixobrychus exilis	BCC, SSC2		Very close	Yes
White-faced ibis, Plegadis chihi	TWL		On site	Yes
Turkey vulture, Cathartes aura	BOP		On site	
Osprey, Pandion haliaetus	BOP		Very close	Yes
Northern harrier, Circus cyaneus	BCC, SSC3, BOP		On site	Yes
Sharp-shinned hawk, Accipiter striatus	BOP		Very close	
Cooper's hawk, Accipiter cooperi	BOP, TWL		Very close	Yes
Bald eagle, Haliaeetus leucocephalus	BGEPA, BCC, CFP		Very close	
Swainson's hawk, Buteo swainsoni	CT, BCC, BOP		Very close	
Ferruginous hawk, Buteo regalis	TWL, BOP		Very close	
Red-tailed hawk, Buteo jamaicensis	BOP		On site	Yes
Red-shouldered hawk, Buteo lineatus	BOP		Very close	
Zone-tailed hawk, Buteo albonotatus	BOP		Very close	
White-tailed kite, Elanus leucurus	CFP, BOP		Very close	
Barn owl, Tyto alba	BOP		Very close	Yes
Great horned owl, Bubo virginianus	BOP		Very close	Yes
Burrowing owl, Athene cunicularia	BCC, SSC2, BOP		Very close	Yes
Short-eared owl, Asio flammeus	SSC3, BOP		Very close	Yes
Gila woodpecker, Melanerpes uropygialis	CE, BCC		Very close	
American kestrel, Falco sparverius	BOP		On site	Yes
Merlin, Falco columbarius	BOP, TWL		On site	
Prairie falcon, Falco mexicanus	BCC, BOP, TWL		Very close	

F B-13 cont'd

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	Status¹	Occurrence likelihood		
Common name, Species name		Imperial	Data bases, site visits	Known collisions
Peregrine falcon, Falco peregrinus	CFP, BCC		Very close	Yes
Willow flycatcher, Empidonax traillii	BCC		Very close	
Vermilion flycatcher, Pyrocephalus rubinus	SSC2		On site	
Olive-sided flycatcher, Contopus cooperi	SSC2		Very close	Yes
Loggerhead shrike, Lanius ludovicianus	BCC, SSC2		On site	Yes
California horned lark, Eremophila alpestris actia	TWL		Very close	Yes
Purple martin, Progne subis	SSC2		Very close	
Bank swallow, Riparia riparia	СТ		Very close	Yes
Verdin, Auriparus flaviceps	BCC		On site	
Black-tailed gnatcatcher, Polioptila melanura	TWL		On site	
Crissal thrasher, Toxostoma crissale	SSC ₃		Very close	Yes
Lawrence's goldfinch, Spinus lawrencei	BCC		Very close	
Vesper sparrow, Pooecetes gramineus affinis	SSC2		Very close	Yes
Bell's sage sparrow, Amphispiza belli	TWL		Very close	Yes
Large-billed savannah sparrow, Passerculus s. rostratus	SSC2		On site	Yes
Bullock's oriole, Icterus bullockii	BCC		Very close	
Yellow-headed blackbird, X. xanthocephalus	SSC3		On site	Yes
Tricolored blackbird, Agelaius tricolor	BCC, CT		On site	
Yellow warbler, Setophaga petechia	BCC, SSC2		On site	Yes
Yellow-breasted chat, Icteria virens	SSC3		Very close	Yes
Summer tanager, Piranga rubra	SSC1		Very close	
Pallid bat, Antrozous pallidus	BLM, SSC, WBWG:H		In region	Yes (fence)
Townsend's western big-eared bat, Plecotus t. townsendii	BLM, SSC, WBWG:H		In range	
Western mastiff bat, Eumops perotis	BLM, SSC, WBWG:H		In region	
Western red bat, Lasiurus blossevillii	SSC, WBWG:H		In region	
Western yellow bat, Lasiurus xanthinus	SSC, WBWG:H		In region	
Small-footed myotis, Myotis cililabrum	BLM, WBWG:M		In range	
Miller's myotis, Myotis evotis	WBWG:M		In range	

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		Occurrence likelihood		
Common name, Species name	Status ¹	Imperial	Data bases, site visits	Known collisions
Fringed myotis, Myotis thysanodes	BLM, WBWG:H		In range	
Long-legged myotis, Myotis volans	WBWG:H		In range	
Yuma myotis, Myotis yumanensis	SSC, WBWG:LM		In region	
Pocketed free-tailed bat, Nyctinomops femorosaccus	SSC, WBWG:M		In region	
Big free-tailed bat, Nyctinomops macrotis	SSC, WBWG:MH		In region	
Hoary bat, Lasiurus cinereus	WBWG:M		In region	
American badger, Taxidea taxus	SSC		In region	
Flat-tailed horned lizard, Phrynosoma mcallii	SSC		Nearby	

1 Listed as FE or FT = federal endangered or threatened, BCC = U.S. Fish and Wildlife Service Bird of Conservation Concern, CE or CT = California endangered or threatened, CFP = California Fully Protected (CDFG Code 3511), SSC = California species of special concern (not threatened with extinction, but rare, very restricted in range, declining throughout range, peripheral portion of species' range, associated with habitat that is declining in extent) with priorities 1, 2 and 3, respectively (Shuford and Gardali 2008), BOP = California Fish and Game Code 3503.5 (Birds of Prey), TWL = Taxa to Watch List (Shuford and Gardali 2008), WBWG = Western Bat Working Group listing with level of priority.

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IMPACTS TO BIOLOGICAL RESOURCES

Determination of occurrence likelihoods of special-status species is not, in and of itself, an analysis of potential project impacts. An impacts analysis should consider whether and how a proposed project would affect members of a species, larger demographic units of the species, or the whole of a species. In the following, I analyze several types of impacts likely to result from the project, and none of which are analyzed in the DEIR.

F B-14

WILDLIFE MOVEMENT

The DEIR focuses its analysis on wildlife movement corridors as the only issue that would determine whether the project would interfere with wildlife movement in the region. According to the DEIR (p. 3.5-26), "The project site does not function as a wildlife corridor." But this is not what I saw of the project site, e.g., see Photos 4-7 and 20 and 21. I saw thousands of birds flying north and south across the site, parallel to the New River. Some of the birds flew high enough to suffer no interference to their movement should the project be built, but too many of them flew low to the ground where they would either have to alter their flight trajectories or risk collision with the project's fence, gen-tie or PV panels. Significantly, a flock of tricolored blackbirds – a threatened species – flew across the site at heights ranging from a few inches to a few feet off the ground.

Regardless of whether the site is situated within a wildlife movement corridor, the DEIR adopts a CEQA standard of analysis that does not exist. The CEQA standard is whether a project will "Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors..." The primary phrase of the standard goes to wildlife movement regardless of whether the movement is channeled by a corridor or a linkage. And anyhow, corridors are typically regarded in science as human-created landscape structures intended to reduce the effects of habitat fragmentation, and only infrequently as a channelization of wildlife movement caused by landscape structure (Smallwood 2015).

F B-15

Wildlife movement in a region is often diffuse rather than channeled (Runge et al. 2014, Taylor et al. 2011) unless anthropogenic changes have forced channeling or targeting of "island" patches of habitat (Smallwood 2015). Wildlife movement must include stopover opportunities for birds and bats (Taylor et al. 2011), and staging habitat (Warnock 2010) during dispersal, migration or home range patrol. Many species of wildlife likely use the site of the proposed project for movement across the region, and based on my brief observations at the site, multiple species do in fact use the site to move across the region. The project, with its fencing and arrays of PV panels, would cut wildlife off from stopover and staging opportunities, and would lengthen the distances that wildlife must travel before finding alternate stopover habitat. Those birds that mistake the arrays of solar panels for bodies of water would die there, hence moving no further. The project, therefore, would interfere with wildlife movement in the region.

HABITAT LOSS

The DEIR does not address the loss of wildlife that would result from habitat loss caused by the project. No mention is made of habitat fragmentation, nor of the project site role as stopover and staging opportunities for migratory wildlife. No mention is made of what happens to the existing habitat once the 30 to 40-year lifespan of the project's equipment ends. Most likely, the project would be proposed for re-permitting, or the site would be proposed for another industrial use that covers the deadened soils with impervious surface. The DEIR should be revised to more clearly explain the magnitude of the losses of habitat to wildlife and for how long those losses would persist.

F B-16

Habitat loss not only results in the immediate numerical decline of wildlife, but also in permanent loss of productive capacity (Smallwood 2015). For example, two study sites in grassland/wetland/woodland complexes had total bird nesting densities of 32.8 and 35.8 nests per acre (Young 1948, Yahner 1982) for an average 34.3 nests per acre. The environmental conditions of these two study sites differed from the project site by including more woodland and more wetland, but they exemplify the high productivity of avian habitat. Assuming the nest density at the project site is half the densities of the two study sites I cited, 17.15 nests/acre multiplied against 227 acres would predict a loss of 3,893 bird nests. The average number of fledglings per nest in Young's (1948) study was 2.9. Assuming Young's (1948) study site typifies bird productivity, then the project's removal of nest opportunities from the limited capacity of such opportunities would prevent the production of 11,290 fledglings per year. After 40 years and assuming an average generation time of 5 years, the lost capacity of both breeders and annual fledgling production can be estimated from the following formula: {(nests/year × chicks/nest × number of years) + ((2 adults/nest × nests/year) × (number of years ÷ years/generation)). In the case of this project, and given my stated assumptions, this formula predicts the project would deny California 513,888 birds over the 40 years due solely to loss of terrestrial habitat. This predicted loss of 12,847 birds/year would be substantial, and would qualify as a significant impact that has not been addressed in the DEIR.

F B-17

The project would eliminate much of the remaining open-space habitat currently available to numerous special-status species, including northern harrier, merlin, California gull and other species I detected at the project site and many others I would likely detect with an extended survey effort. The project would eliminate much of the remaining habitat in the area that is currently useful to many special-status species listed in Table 3, including burrowing owl. Winter migrants such as merlin would lose access to 227 acres of forage that is critical to their ability to successfully breed come spring. Two hundred and twenty-seven acres is a lot of habitat space that has been used for thousands of years by what are now designated as special-status species. Once the site is covered by solar panels, the habitat values of the site would be lost, and the habitat value of the scrubland along the railroad tracks would be degraded. The habitat restoration announced just west of the site would lose much of its value. The DEIR should be revised to appropriately analyze habitat loss as a potential project impact to birds and other wildlife.

F B-18

COLLISION MORTALITY

The proposed project includes a number of structural features that would cause collision mortality to birds and possibly bats. Although reports of fatality monitoring at utility-scale solar projects are available (cited in Smallwood 2020, Smallwood in press), the DEIR does not cite them. The DEIR provides no predictive analysis of potential impacts of collision mortality. The evidence needed for impact predictions is certainly available.

F B-19

The project would add 40 MW of PV panels, 9.26 km of 6-foot-tall chain-link fence topped by barbed wire, 2.9 km of gen-tie, a BESS of unspecified height, an electrical substation, and other ancillary facilities and equipment. All of these structures would be inserted into a portion of the aerosphere that is of critical importance to volant wildlife, including wildlife that fly at night. And the volant wildlife using that portion of the aerosphere have been doing so for many thousands of years without the presence of anthropogenic structures in their way. I reviewed the available fatality monitoring reports at California utility-scale solar projects to quantify fatality rates at solar PV panels, gen-ties and fences, among other project elements. Below are predictions of project impacts based on mean fatality rates estimated from 14 other utility-scale solar projects (Smallwood 2020, Smallwood in press).

Collision Mortality at Utility-scale Solar PV Panels

The 40 MW of solar PV panels would kill birds and bats. Recent fatality monitoring at utility-scale solar projects in California provides the basis for predicting avian and bat mortality that would be caused by the project's PV panels. Based on a weighted mean 11.605 (95% CI: 8.570–16.626) bird fatalities/MW/year and 0.059 (95% CI: 0.01–0.10) bat fatalities/MW/year among California's solar PV projects, the project's 40 MW of solar PV would likely kill 464 (95% CI: 343–665) birds per year and 2 (95% CI: 0.4–4) bats per year. After 40 years of this level of mortality, the project's solar PV would have killed 18,560 (95% CI: 13,720–26,600) birds and 80 (95% CI: 16–160) bats. This predicted level of mortality would easily qualify as an unmitigated significant impact to birds. Its annual death toll caused by the PV panels would persist for as long as the PV panels remains beyond my projected 40-year lifespan of the solar PV equipment, or as long as replacement panels operate.

F B-20

Collision Mortality along the Gen-tie

The 2.9-km length of gen-tie would kill birds. Recent fatality monitoring along gen-ties of utility-scale solar projects in California provides the basis for predicting avian mortality that would be caused by the project's gen-tie. Based on a weighted mean 113.162 (95% CI: 71.780–198.424) fatalities/km/year along gen-ties of California's solar projects, the project's gen-tie would likely kill 328 (95% CI: 208–575) birds per year. After 40 years of this level of mortality, the project's gen-tie would have killed 13,120 (95% CI: 8,320–23,000) birds. Considering that this weighted mean fatality rate was based on gen-ties that had been mitigated in the same ways proposed in the DEIR, including spacing between phased elements and line-marking, this predicted level of

F B-21

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mortality would easily qualify as an unmitigated significant impact. Its annual death toll caused by the gen-tie would persist for as long as the gen-tie remains beyond my projected 40-year lifespan of the solar PV equipment.

F B-21 cont'd

Collision Mortality along Fences

The 9.26 km of fencing of the project would kill birds (Photo 31). Recent fatality monitoring along fences of utility-scale solar projects in California provides the basis for predicting avian mortality that would be caused by the project's fence. Based on a weighted mean 14.435 (95% CI: 10.880–20.339) birds/km/year along fences of California's solar projects, the project's fence would likely kill 134 (95% CI: 101–188) birds per year. After 40 years of this level of mortality, the project's fencing would have killed 5,360 (95% CI: 4,040–7,520) birds. Because the DEIR identifies no particular mitigation measure to minimize or reduce bird mortality caused by fencing, and because no other solar project has demonstrated fatality reduction along its fences, this predicted level of mortality would easily qualify as an unmitigated significant impact. Its annual death toll caused by the fence would persist for as long as the fence remains beyond my projected 40-year lifespan of the solar PV equipment.

F B-22



Photo 31. A great-horned owl died after becoming entangled on the razor wire placed on top of this cyclone fence surrounding a substation in Alameda County. Photo by Joanne Mount.

Greater roadrunners are particularly vulnerable to mortality on perimeter security fences at utility-scale solar projects (Smallwood 2020, Smallwood in press). Greater roadrunners occur at the project site, so the risk to greater roadrunners is evident.

Estimated Combined Numerical Impacts to Volant Vertebrate Wildlife

I have not developed predictive tools for all of the numerical impacts from habitat loss and collision mortality. Examples of predictive shortfalls include habitat loss to bats and collision mortality with structures such as the electrical substation and the BESS. These tools can be developed for use with the DEIR, however, and perhaps they already have. I have also not developed the means to quantify the impacts of collision mortality on social connections within species of wildlife. For example, many of the birds and

F B-23

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bats that die at solar projects would leave behind progeny that would perish on the nest or maternal roost. The impacts would be far greater than what I can predict herein.

Collision mortality with the project's solar PV is predicted at 2 bats per year (range 0.4 to 4). The combined numerical impacts of habitat loss and collision mortality is 13,773 birds per year (range 13,499 to 14,275). The combined 40-year toll for birds would be 550,920 (95% CI: 539,960-571,000). The project's predicted unmitigated deficit of volant wildlife would be nearly 500 bats and at least a quarter million birds.

F B-23 cont'd

CUMULATIVE IMPACTS

The DEIR lists existing and proposed projects within its cumulative impacts scope. Other than simply listing these projects, the DEIR makes no attempt to predict cumulative impacts. I took the liberty of doing so. For habitat loss impacts, I relied on the assumptions I summarized above to estimate the cumulative annual loss of birds due to lost habitat at the listed projects. For collision mortality, I relied on MW-weighted mean estimates of project-level of fatality rates attributable to PV panels, gentie, and the fence (Smallwood 2020, in press). I summed the predicted annual impacts across projects, and then I added the summed annual estimates between habitat loss and collision mortality, and I multiplied the sums by 40 years to represent cumulative project-level impacts. In reality, the habitat impacts would continue indefinitely.

F B-24

The cumulative annual loss of birds from collision mortality is predicted to be 64,047 (95% CI: 45,072–98,749). The annual loss of birds from habitat loss is predicted to be an order of magnitude greater at 646,425. Over 40 years, the cumulative impacts of the projects identified in the DEIR would deny California 28,418,851 birds. The average cost of birds per MW per year would be 247. These numbers would contribute substantially to the trend of declining birds in North America, as reported by Rosenberg et al. (2019). Many of the birds that would be harmed by habitat loss and collision mortality would be members of special-status species. Cumulative impacts would be significant. The DEIR should be revised to address these impacts.

F B-25

Otherwise, the DEIR adopts a flawed approach to analysis of cumulative impacts. For each species or group of species addressed, the DEIR implies that cumulative impacts are really just residual impacts of incomplete mitigation. If this was CEQA's standard, then cumulative effects analysis would be merely an analysis of mitigation efficacy. The DEIR's implied standard is not the standard of analysis of cumulative effects. CEQA defines cumulative impacts, and it outlines two general approaches for performing the analysis. Given that North America has lost nearly a third of its birds over the past half century (Rosenberg et al. 2019), and given that simple calculations reveal the cumulative impacts of utility-scale solar projects would deny Californians of millions of birds, an appropriate cumulative effects analysis is warranted. The DEIR needs to be revised so that it includes a cumulative effects analysis that meets the standards of CEQA.

MITIGATION MEASURES

BIO-1 General Impact Avoidance and Minimization Measures

I concur that the proposed measures should be implemented, but I must add that none of the proposed measures would minimize project impacts by more than trivial degrees. The major impacts are in habitat loss and collision mortality, which none of the proposed measures would lessen from the levels I predicted in my comments. For example, complying with APLIC standards would prevent collisions with the Gen-tie to the same degree that the same standards achieved at the projects that contributed to my review of impacts from utility-scale solar projects (Smallwood 2020, in press).

The DEIR assures that "All electrical components on the project site shall be either undergrounded or protected so that there will be no exposure to wildlife and therefore no potential for electrocution," but elsewhere the DEIR reports that the gen-tie's lines would be mounted on 66-foot-tall poles. Birds cannot be protected from colliding with these lines to any degree greater than achieved by line markers deployed at other solar projects where fatalities were monitored and fatality rates reported.

BIO-2 Worker Environmental Awareness Program

A worker awareness program should be implemented. I must note, however, that this measure would prevent few of the impacts I addressed in this comment letter. Most of the impacts would happen outside the control of the workers. Aware workers would not prevent habitat loss, nor would they prevent wildlife collisions with PV panels, powerlines and fences.

BIO-3 Burrowing Owl Avoidance and Minimization

To implement the standard of CDFW (2012), as the DEIR says will be done, detection surveys need to be completed by qualified biologists prior to the circulation of the DEIR to the public and decision-makers. A preconstruction survey performed as a surrogate for detection surveys would be inconsistent with the survey and mitigation guidelines of CDFW (2012). It would not be effective.

BIO-4 Pre-Construction Nesting Bird Survey

The DEIR proposes construction timing and preconstruction, take-avoidance surveys to avoid impacts to breeding birds. Whereas I agree that preconstruction surveys would be appropriate, it must be understood by decision-makers and the public that such surveys typically detect small fractions of the animals targeted. Nesting birds are highly adept at concealment to avoid predation. Over such a large area and with such dense shrubs around site, the notion that more than a few animals would be detected would be fantasy. Furthermore, preconstruction, take-avoidance surveys ultimately fail to prevent the impacts of habitat loss, resulting in the loss of productive capacity of the site.

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F B-26

F B-27

F B-29

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Preconstruction surveys should not be performed without first having performed detection surveys. Preconstruction surveys are no substitute for detection surveys. Species detection surveys are needed to (1) support negative findings of species when appropriate, (2) inform preconstruction surveys to improve their efficacy, (3) estimate project impacts, and (4) inform compensatory mitigation and other forms of mitigation. Detection survey protocols and guidelines are available from resource agencies for most special-status species. Otherwise, professional standards can be learned from the scientific literature and species' experts.

F B-29 cont'd

RECOMMENDED MEASURES

Habitat Loss: If the project goes forward, compensatory mitigation would be warranted for habitat loss. An equal area of open space should be protected in perpetuity as close to the project site as possible. The impacts of interference with wildlife movement by the security fence should be minimized by reducing the length of fence and using a different type of fencing that increases opacity and minimizes the risk of entanglement. The fence should also include gaps to enable non-volant wildlife to pass through.

F B-30

Fund Wildlife Rehabilitation Facilities: Compensatory mitigation ought also to include funding contributions to wildlife rehabilitation facilities to cover the costs of injured animals that will be delivered to these facilities for care. Many animals would likely be injured by collisions with project infrastructure. Wildlife rehabilitators should not be stuck with the cost burden for care of wildlife that are injured by the project.

F B-31

Post-construction Impacts Monitoring: The DEIR should be revised to include a plan for fatality monitoring and adaptive management. Based on my review of available reports of monitoring at utility-scale solar projects, it is clear that the causal factors of collisions are little known, and no mitigation measures have yet been suitably tested for efficacy (Smallwood 2020, in press). Research into causal factors of wildlife collisions with utility-scale PV facilities has been non-existent. I therefore recommend that research also be funded as a mitigation measure and that it be linked to fatality monitoring.

F B-32

Understanding why wildlife fatalities are happening and how to reduce them requires high accuracy in fatality rate estimation. But understanding causal factors also requires behavior surveys performed by qualified behavioral ecologists, who would need to sample the project with sufficient survey effort and at sufficient spatial/temporal grain to discern avian reactions to project elements and to any experimental treatments applied to reduce fatalities. Fatality monitoring and behavior surveys can inform of the efficacies of mitigation measures that are implemented with appropriate tenets of experimental design (Sinclair and DeGeorge 2016).

A post-construction monitoring plan should be prepared, and it should be included with a revised DEIR. Consideration should be given to the desired carcass detection rate, because that rate would determine the speed at which fatality searches can be completed, the accuracy of fatality estimates, and the appropriate duration of fatality

monitoring. It also affects the cost of the fatality monitoring effort. Below is a framework of a fatality monitoring plan that includes best practices:

- 1. Keep it simple;
- 2. Have a plan and a budget for responding to the discoveries of injured wildlife;
- 3. Ask solar company employees to leave carcasses alone;
- Search all of the solar arrays in the project, or a substantial randomized sample or a systematic sample with random starting points;
- 5. Delineate unsearchable areas due to hazards, dense vegetation or other factors;
- 6. Use scent-detection dogs with skilled handlers (Smallwood et al. 2020), either off-leash to achieve detection rates of available carcasses (i.e., those not removed by scavengers yet) of 50% to 60%, or on-leash to achieve detection rates >90%;
- 7. Implement no more than one search interval, i.e., number of days between searches, but the search interval should be a targeted average rather than a strict time to provide flexibility to the scent-detection dog team;
- 8. Minimum monitoring duration should be 3 years;
- Refrain from performing 'clearing searches' because they're ineffective and unnecessary;
- Upon discovery of feathers, stop and search increasingly larger circles to determine whether more feathers can lead to the carcass;
- 11. Integrate carcass detection trials into routine fatality monitoring by randomly placing just-thawed, fresh-frozen carcasses of appropriate bird and bat species onto the search areas at a rate of about 2.3 g/ha/year, where appropriate species means those likely to be killed by features of the project and include the full range of body sizes;
- 12. In carcass detection trials, place many more of the smallest birds and bats because detections of those trial carcasses are necessary but more rarely achieved:
- 13. Mark trial carcasses discreetly and safely with regard to scavengers snipping toes and the ends of flight feathers works well, or one foot of each bat;
- 14. Weigh trial carcasses just prior to placement;
- 15. Keep searchers blind to the trial placements by using a disciplined trial administrator who places carcasses while searchers are not onsite and who leaves no obvious evidence of each visit other than the carcass itself;
- 16. Upon placement, drop each trial carcass from waist height, and then photograph and map the location with high-end GPS and take notes of the location, e.g., 10 cm east of white pebble and 2 m north of 1-m long north-south oriented stick, or 2 m west of PV panel number X;
- 17. Leave all fatality and trial carcasses in the field, thereafter monitoring subsequent detections of the same carcasses;
- 18. All carcasses in integrated trials are either found or not found, so do not attempt to separate trials for searcher detection and carcass persistence;
- 19. Count fatalities discovered incidentally to routine fatality monitoring, including those found beyond the maximum search radius of a sampled unit, but omit those found at units not selected for sampling (if sampling was used instead of census):
- Map and photograph all fatalities and trial carcasses every time they are detected;

F B-32 cont'd

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- 21. Enter data into electronic spreadsheet daily and share data with supervisor no less often than weekly to identify and resolve problems in a timely manner;
- 22. Identify all remains to species, so include sufficient budget for visiting museums or experts to achieve this objective (every species misidentification adds error to two species to the species misidentified and to the species not identified);
- 23. See Smallwood et al. (2018) for details on how to use the data in a simple estimator;
- 24. Repeat the monitoring effort 10 years after the first monitoring effort;
- 25. Share data and reports publicly and require peer-review by independent party.

Below is a framework for behavior surveys that aim to inform of causal factors via rates of certain risky behaviors and collision near-misses:

- Use behavioral ecologists to either perform behavior surveys or to train the biologists who would perform the surveys;
- 2. Perform 1-hour visual scan surveys focused on each sampling plot searched by scent-detection dogs per fatality monitoring;
- 3. Record positions of behavior survey stations;
- Alter start times randomly from dawn until dusk, but not while the fatality searchers are on the plot;
- 5. Limit observations to 300 m from the observer;
- Record observations into a handheld digital voice recorder, which are to be transcribed to an electronic spreadsheet later the same day;
- 7. Record significant events to handheld printed photo-maps of the plot, where significant events include collisions, near-misses and other reactions to project elements, as well as uses made of project elements by birds (perching, nesting);
- 8. Record species of birds visiting the plot, flock size, behavior, height above ground, flight path (record on map) and time on plot;
- Record wind speed and direction, temperature and weather conditions at beginning and end of each survey;
- 10. Digitize data recorded on photo-map for spatial analysis using GIS;
- 11. See methods in Smallwood (2017).

I further recommend that nocturnal surveys be performed. I used a FLIR T620 thermal-imaging camera with an 88.9 mm telephoto lens for this purpose, but other options are available. I recommend surveys are performed within 3 hours after dark to determine whether collisions might be happening at night rather than during the day. Such surveys allowed me to witness actual collisions with wind turbines, but more importantly many near-misses (Smallwood and Bell 2020a,b).

As mentioned in recommended fatality monitoring practice 25, above, transparency is critically important. The fatality monitoring performed at solar projects I reviewed was hidden from the public for too long. Poor study methods could have been curtailed early had experienced biologists been able to review them. Peer review is essential, and so is the sharing of data in a timely manner. The poor practices of the past should not be repeated at this or any other solar project.

F B-32 cont'd

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F B-34

Thank you for your attention,

Show Sullwood

Shawn Smallwood, Ph.D.

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Photo 32. Black-tailed gnatcatcher at the project site, 4 February 2022.

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Kenneth Shawn Smallwood Curriculum Vitae

3108 Finch Street Davis, CA 95616 Phone (530) 756-4598 Cell (530) 601-6857 puma@den.org Born May 3, 1963 in Sacramento, California. Married, father of two.

Ecologist

Expertise

- Finding solutions to controversial problems related to wildlife interactions with human industry, infrastructure, and activities;
- Wildlife monitoring and field study using GPS, thermal imaging, behavior surveys;
- Using systems analysis and experimental design principles to identify meaningful ecological patterns that inform management decisions.

Education

Ph.D. Ecology, University of California, Davis. September 1990. M.S. Ecology, University of California, Davis. June 1987. B.S. Anthropology, University of California, Davis. June 1985. Corcoran High School, Corcoran, California. June 1981.

Experience

- 480 professional publications, including:
- 83 peer reviewed publications
- 24 in non-reviewed proceedings
- 371 reports, declarations, posters and book reviews
- 8 in mass media outlets
- 87 public presentations of research results

Editing for scientific journals: Guest Editor, Wildlife Society Bulletin, 2012-2013, of invited papers representing international views on the impacts of wind energy on wildlife and how to mitigate the impacts. Associate Editor, Journal of Wildlife Management, March 2004 to 30 June 2007. Editorial Board Member, Environmental Management, 10/1999 to 8/2004. Associate Editor, Biological Conservation, 9/1994 to 9/1995.

Member, Alameda County Scientific Review Committee (SRC), August 2006 to April 2011. The five-member committee investigated causes of bird and bat collisions in the Altamont Pass Wind Resource Area, and recommended mitigation and monitoring measures. The SRC

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- reviewed the science underlying the Alameda County Avian Protection Program, and advised the County on how to reduce wildlife fatalities.
- Consulting Ecologist, 2004-2007, California Energy Commission (CEC). Provided consulting services as needed to the CEC on renewable energy impacts, monitoring and research, and produced several reports. Also collaborated with Lawrence-Livermore National Lab on research to understand and reduce wind turbine impacts on wildlife.
- Consulting Ecologist, 1999-2013, U.S. Navy. Performed endangered species surveys, hazardous waste site monitoring, and habitat restoration for the endangered San Joaquin kangaroo rat, California tiger salamander, California red-legged frog, California clapper rail, western burrowing owl, salt marsh harvest mouse, and other species at Naval Air Station Lemoore; Naval Weapons Station, Seal Beach, Detachment Concord; Naval Security Group Activity, Skaggs Island; National Radio Transmitter Facility, Dixon; and, Naval Outlying Landing Field Imperial Beach.
- Part-time Lecturer, 1998-2005, California State University, Sacramento. Instructed Mammalogy, Behavioral Ecology, and Ornithology Lab, Contemporary Environmental Issues, Natural Resources Conservation.
- Senior Ecologist, 1999-2005, BioResource Consultants. Designed and implemented research and monitoring studies related to avian fatalities at wind turbines, avian electrocutions on electric distribution poles across California, and avian fatalities at transmission lines.
- Chairman, Conservation Affairs Committee, The Wildlife Society--Western Section, 1999-2001.

 Prepared position statements and led efforts directed toward conservation issues, including travel to Washington, D.C. to lobby Congress for more wildlife conservation funding.
- Systems Ecologist, 1995-2000, Institute for Sustainable Development. Headed ISD's program on integrated resources management. Developed indicators of ecological integrity for large areas, using remotely sensed data, local community involvement and GIS.
- Associate, 1997-1998, Department of Agronomy and Range Science, University of California, Davis. Worked with Shu Geng and Mingua Zhang on several studies related to wildlife interactions with agriculture and patterns of fertilizer and pesticide residues in groundwater across a large landscape.
- Lead Scientist, 1996-1999, National Endangered Species Network. Informed academic scientists and environmental activists about emerging issues regarding the Endangered Species Act and other environmental laws. Testified at public hearings on endangered species issues.
- Ecologist, 1997-1998, Western Foundation of Vertebrate Zoology. Conducted field research to determine the impact of past mercury mining on the status of California red-legged frogs in Santa Clara County, California.
- Senior Systems Ecologist, 1994-1995, EIP Associates, Sacramento, California. Provided consulting services in environmental planning, and quantitative assessment of land units for their

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conservation and restoration opportunities basedon ecological resource requirements of 29 special-status species. Developed ecological indicators for prioritizing areas within Yolo County to receive mitigation funds for habitat easements and restoration.

Post-Graduate Researcher, 1990-1994, Department of Agronomy and Range Science, *U.C. Davis*. Under Dr. Shu Geng's mentorship, studied landscape and management effects on temporal and spatial patterns of abundance among pocket gophers and species of Falconiformes and Carnivora in the Sacramento Valley. Managed and analyzed a data base of energy use in California agriculture. Assisted with landscape (GIS) study of groundwater contamination across Tulare County, California.

Work experience in graduate school: Co-taught Conservation Biology with Dr. Christine Schonewald, 1991 & 1993, UC Davis Graduate Group in Ecology; Reader for Dr. Richard Coss's course on Psychobiology in 1990, UC Davis Department of Psychology; Research Assistant to Dr. Walter E. Howard, 1988-1990, UC Davis Department of Wildlife and Fisheries Biology, testing durable baits for pocket gopher management in forest clearcuts; Research Assistant to Dr. Terrell P. Salmon, 1987-1988, UC Wildlife Extension, Department of Wildlife and Fisheries Biology, developing empirical models of mammal and bird invasions in North America, and a rating system for priority research and control of exotic species based on economic, environmental and human health hazards in California. Student Assistant to Dr. E. Lee Fitzhugh, 1985-1987, UC Cooperative Extension, Department of Wildlife and Fisheries Biology, developing and implementing statewide mountain lion track count for long-term monitoring.

Fulbright Research Fellow, Indonesia, 1988. Tested use of new sampling methods for numerical monitoring of Sumatran tiger and six other species of endemic felids, and evaluated methods used by other researchers.

Projects

Repowering wind energy projects through careful siting of new wind turbines using map-based collision hazard models to minimize impacts to volant wildlife. Funded by wind companies (principally NextEra Renewable Energy, Inc.), California Energy Commission and East Bay Regional Park District, I have collaborated with a GIS analyst and managed a crew of five field biologists performing golden eagle behavior surveys and nocturnal surveys on bats and owls. The goal is to quantify flight patterns for development of predictive models to more carefully site new wind turbines in repowering projects. Focused behavior surveys began May 2012 and continue. Collision hazard models have been prepared for seven wind projects, three of which were built. Planning for additional repowering projects is underway.

Test avian safety of new mixer-ejector wind turbine (MEWT). Designed and implemented a beforeafter, control-impact experimental design to test the avian safety of a new, shrouded wind turbine developed by Ogin Inc. (formerly known as FloDesign Wind Turbine Corporation). Supported by a \$718,000 grant from the California Energy Commission's Public Interest Energy Research program and a 20% match share contribution from Ogin, I managed a crew of seven field biologists who performed periodic fatality searches and behavior surveys, carcass detection trials, nocturnal behavior surveys using a thermal camera, and spatial analyses with the collaboration of a GIS

analyst. Field work began 1 April 2012 and ended 30 March 2015 without Ogin installing its MEWTs, but we still achieved multiple important scientific advances.

Reduce avian mortality due to wind turbines at Altamont Pass. Studied wildlife impacts caused by 5,400 wind turbines at the world's most notorious wind resource area. Studied how impacts are perceived by monitoring and how they are affected by terrain, wind patterns, food resources, range management practices, wind turbine operations, seasonal patterns, population cycles, infrastructure management such as electric distribution, animal behavior and social interactions.

Reduce avian mortality on electric distribution poles. Directed research toward reducing bird electrocutions on electric distribution poles, 2000-2007. Oversaw 5 founds of fatality searches at 10,000 poles from Orange County to Glenn County, California, and produced two large reports.

Cook et al. v. Rockwell International et al., No. 90-K-181 (D. Colorado). Provided expert testimony on the role of burrowing animals in affecting the fate of buried and surface-deposited radioactive and hazardous chemical wastes at the Rocky Flats Plant, Colorado. Provided expert reports based on four site visits and an extensive document review of burrowing animals. Conducted transect surveys for evidence of burrowing animals and other wildlife on and around waste facilities. Discovered substantial intrusion of waste structures by burrowing animals. I testified in federal court in November 2005, and my clients were subsequently awarded a \$553,000,000 judgment by a jury. After appeals the award was increased to two billion dollars.

Hanford Nuclear Reservation Litigation. Provided expert testimony on the role of burrowing animals in affecting the fate of buried radioactive wastes at the Hanford Nuclear Reservation, Washington. Provided three expert reports based on three site visits and extensive document review. Predicted and verified a certain population density of pocket gophers on buried waste structures, as well as incidence of radionuclide contamination in body tissue. Conducted transect surveys for evidence of burrowing animals and other wildlife on and around waste facilities. Discovered substantial intrusion of waste structures by burrowing animals.

Expert testimony and declarations on proposed residential and commercial developments, gas-fired power plants, wind, solar and geothermal projects, water transfers and water transfer delivery systems, endangered species recovery plans, Habitat Conservation Plans and Natural Communities Conservation Programs. Testified before multiple government agencies, Tribunals, Boards of Supervisors and City Councils, and participated with press conferences and depositions. Prepared expert witness reports and court declarations, which are summarized under Reports (below).

<u>Protocol-level surveys for special-status species</u>. Used California Department of Fish and Wildlife and US Fish and Wildlife Service protocols to search for California red-legged frog, California tiger salamander, arroyo southwestern toad, blunt-nosed leopard lizard, western pond turtle, giant kangaroo rat, San Joaquin kangaroo rat, San Joaquin kit fox, western burrowing owl, Swainson's hawk, Valley elderberry longhorn beetle and other special-status species.

Conservation of San Joaquin kangaroo rat. Performed research to identify factors responsible for the decline of this endangered species at Lemoore Naval Air Station, 2000-2013, and implemented habitat enhancements designed to reverse the trend and expand the population.

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<u>Impact of West Nile Virus on yellow-billed magpies</u>. Funded by Sacramento-Yolo Mosquito and Vector Control District, 2005-2008, compared survey results pre- and post-West Nile Virus epidemic for multiple bird species in the Sacramento Valley, particularly on yellow-billed magpie and American crow due to susceptibility to WNV.

Workshops on HCPs. Assisted Dr. Michael Morrison with organizing and conducting a 2-day workshop on Habitat Conservation Plans, sponsored by Southern California Edison, and another 1-day workshop sponsored by PG&E. These Workshops were attended by academics, attorneys, and consultants with HCP experience. We guest-edited a Proceedings published in Environmental Management.

Mapping of biological resources along Highways 101, 46 and 41. Used GPS and GIS to delineate vegetation complexes and locations of special-status species along 26 miles of highway in San Luis Obispo County, 14 miles of highway and roadway in Monterey County, and in a large area north of Fresno, including within reclaimed gravel mining pits.

GPS mapping and monitoring at restoration sites and at Caltrans mitigation sites. Monitored the success of elderberry shrubs at one location, the success of willows at another location, and the response of wildlife to the succession of vegetation at both sites. Also used GPS to monitor the response of fossorial animals to yellow star-thistle eradication and natural grassland restoration efforts at Bear Valley in Colusa County and at the decommissioned Mather Air Force Base in Sacramento County.

Mercury effects on Red-legged Frog. Assisted Dr. Michael Morrison and US Fish and Wildlife Service in assessing the possible impacts of historical mercury mining on the federally listed California red-legged frog in Santa Clara County. Also measured habitat variables in streams.

Opposition to proposed No Surprises rule. Wrote a white paper and summary letter explaining scientific grounds for opposing the incidental take permit (ITP) rules providing ITP applicants and holders with general assurances they will be free of compliance with the Endangered Species Act once they adhere to the terms of a "properly functioning HCP." Submitted 188 signatures of scientists and environmental professionals concerned about No Surprises rule US Fish and Wildlife Service, National Marine Fisheries Service, all US Senators.

Natomas Basin Habitat Conservation Plan alternative. Designed narrow channel marsh to increase the likelihood of survival and recovery in the wild of giant garter snake, Swainson's hawk and Valley Elderberry Longhorn Beetle. The design included replication and interspersion of treatments for experimental testing of critical habitat elements. I provided a report to Northern Territories, Inc.

Assessments of agricultural production system and environmental technology transfer to China. Twice visited China and interviewed scientists, industrialists, agriculturalists, and the Directors of the Chinese Environmental Protection Agency and the Department of Agriculture to assess the need and possible pathways for environmental clean-up technologies and trade opportunities between the US and China.

<u>Yolo County Habitat Conservation Plan</u>. Conducted landscape ecology study of Yolo County to spatially prioritize allocation of mitigation efforts to improve ecosystem functionality within the

County from the perspective of 29 special-status species of wildlife and plants. Used a hierarchically structured indicators approach to apply principles of landscape and ecosystem ecology, conservation biology, and local values in rating land units. Derived GIS maps to help guide the conservation area design, and then developed implementation strategies.

Mountain lion track count. Developed and conducted a carnivore monitoring program throughout California since 1985. Species counted include mountain lion, bobcat, black bear, coyote, red and gray fox, raccoon, striped skunk, badger, and black-tailed deer. Vegetation and land use are also monitored. Track survey transect was established on dusty, dirt roads within randomly selected quadrats.

<u>Sumatran tiger and other felids</u>. Upon award of Fulbright Research Fellowship, I designed and initiated track counts for seven species of wild cats in Sumatra, including Sumatran tiger, fishing cat, and golden cat. Spent four months on Sumatra and Java in 1988, and learned Bahasa Indonesia, the official Indonesian language.

Wildlife in agriculture. Beginning as post-graduate research, I studied pocket gophers and other wildlife in 40 alfalfa fields throughout the Sacramento Valley, and I surveyed for wildlife along a 200 mile road transect since 1989 with a hiatus of 1996-2004. The data are analyzed using GIS and methods from landscape ecology, and the results published and presented orally to farming groups in California and elsewhere. I also conducted the first study of wildlife in cover crops used on vineyards and orchards.

<u>Agricultural energy use and Tulare County groundwater study.</u> Developed and analyzed a data base of energy use in California agriculture, and collaborated on a landscape (GIS) study of groundwater contamination across Tulare County, California.

<u>Pocket gopher damage in forest clear-cuts</u>. Developed gopher sampling methods and tested various poison baits and baiting regimes in the largest-ever field study of pocket gopher management in forest plantations, involving 68 research plots in 55 clear-cuts among 6 National Forests in northern California.

<u>Risk assessment of exotic species in North America</u>. Developed empirical models of mammal and bird species invasions in North America, as well as a rating system for assigning priority research and control to exotic species in California, based on economic, environmental, and human health hazards.

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Comments on Environmental Documents

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- San Gorgonio Crossings EIR (2017; 22 pp);
- Replies to responses on Jupiter Project IS and MND (2017; 12 pp);
- MacArthur Transit Village Project Modified 2016 CEQA Analysis (2017; 12 pp);
- Central SoMa Plan DEIR (2017; 14 pp);
- Colony Commerce Center Specific Plan DEIR (2016; 16 pp);
- Fairway Trails Improvements MND (2016; 13 pp);
- Review of Avian-Solar Science Plan (2016; 28 pp);
- Replies to responses on Initial Study for Pyramid Asphalt (2016; 5 pp);
- Initial Study for Pyramid Asphalt (2016; 4 pp);
- Agua Mansa Distribution Warehouse Project Initial Study (2016; 14 pp);
- Santa Anita Warehouse IS and MND (2016; 12 pp);
- CapRock Distribution Center III DEIR (2016: 12 pp);
- Orange Show Logistics Center Initial Study and MND (2016; 9 pp);
- City of Palmdale Oasis Medical Village Project IS and MND (2016; 7 pp);
- Comments on proposed rule for incidental eagle take (2016, 49 pp);
- Grapevine Specific and Community Plan FEIR (2016; 25 pp);
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- Clinton County Zoning Ordinance for Wind Turbine siting (2016);
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- Tri-City Industrial Complex Initial Study (2016; 5 pp);
- Hidden Canyon Industrial Park Plot Plan 16-PP-02 (2016; 12 pp);
- Kimball Business Park DEIR (2016; 10 pp);
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- Reply Witness Statement on White Pines Wind Farm, Ontario (2015, 10 pp);
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- Proposed Section 24 Specific Plan Agua Caliente Band of Cahuilla Indians DEIS (2015, 9 pp);
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- World Logistic Center Specific Plan FEIR (2015, 12 pp);
- Bay Delta Conservation Plan EIR/EIS (2014, 21 pp);
- Addison Wind Energy Project DEIR (2014, 32 pp);
- Response to Comments on the Addison Wind Energy Project DEIR (2014, 15 pp);
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- Alta East Wind Energy Project FEIS (2013, 23 pp);
- Blythe Solar Power Project Staff Assessment, California Energy Commission (2013, 16 pp);
- Clearwater and Yakima Solar Projects DEIR (2013, 9 pp);
- Cuyama Solar Project DEIR (2014, 19 pp);
- Draft Desert Renewable Energy Conservation Plan (DRECP) EIR/EIS (2015, 49 pp);
- Kingbird Solar Photovoltaic Project EIR (2013, 19 pp);
- Lucerne Valley Solar Project Initial Study & Mitigated Negative Declaration (2013, 12 pp);
- Palen Solar Electric Generating System Final Staff Assessment of California Energy Commission, (2014, 20 pp);
- Rebuttal testimony on Palen Solar Energy Generating System (2014, 9 pp);
- Rising Tree Wind Energy Project DEIR (2014, 32 pp);
- Response to Comments on the Rising Tree Wind Energy Project DEIR (2014, 15 pp);
- Soitec Solar Development Project Draft PEIR (2014, 18 pp):
- Comment on the Biological Opinion (08ESMF-00-2012-F-0387) of Oakland Zoo expansion on Alameda whipsnake and California red-legged frog (2014; 3 pp);
- West Antelope Solar Energy Project Initial Study and Negative Declaration (2013, 18 pp);
- Willow Springs Solar Photovoltaic Project DEIR (2015, 28 pp);
- Alameda Creek Bridge Replacement Project DEIR (2015, 10 pp);
- Declaration on Tule Wind project FEIR/FEIS (2013; 24 pp);
- Sunlight Partners LANDPRO Solar Project Mitigated Negative Declaration (2013; 11 pp);
- Declaration in opposition to BLM fracking (2013; 5 pp);
- Rosamond Solar Project Addendum EIR (2013; 13 pp);
- Pioneer Green Solar Project EIR (2013; 13 pp);
- Reply to Staff Responses to Comments on Soccer Center Solar Project Mitigated Negative

- Declaration (2013; 6 pp),
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- Plainview Solar Works Mitigated Negative Declaration (2013; 10 pp);
- Reply to the County Staff's Responses on comments to Imperial Valley Solar Company 2 Project (2013; 10 pp);
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- FRV Orion Solar Project DEIR (PP12232) (2013, 9 pp);
- Casa Diablo IV Geothermal Development Project (3013; 6 pp);
- Reply to Staff Responses to Comments on Casa Diablo IV Geothermal Development Project (2013; 8 pp);
- FEIS prepared for Alta East Wind Project (2013; 23 pp);
- Metropolitan Air Park DEIR, City of San Diego (2013;);
- Davidon Homes Tentative Subdivision Map and Rezoning Project DEIR (2013; 9 pp);
- Analysis of Biological Assessment of Oakland Zoo Expansion Impacts on Alameda Whipsnake (2013; 10 pp);
- Declaration on Campo Verde Solar project FEIR (2013; 11pp);
- Neg Dec comments on Davis Sewer Trunk Rehabilitation (2013; 8 pp);
- Declaration on North Steens Transmission Line FEIS (2012; 62 pp);
- City of Lancaster Revised Initial Study for Conditional Use Permits 12-08 and 12-09, Summer Solar and Springtime Solar Projects (2012; 8 pp);
- J&J Ranch, 24 Adobe Lane Environmental Review (2012; 14 pp);
- Reply to the County Staff's Responses on comments to Hudson Ranch Power II Geothermal Project and the Simbol Calipatria Plant II (2012; 8 pp);
- Hudson Ranch Power II Geothermal Project and the Simbol Calipatria Plant II (2012; 9 pp);
- Desert Harvest Solar Project EIS (2012; 15 pp);
- Solar Gen 2 Array Project DEIR (2012; 16 pp);
- Ocotillo Sol Project EIS (2012; 4 pp);
- Beacon Photovoltaic Project DEIR (2012; 5 pp);
- Declaration on Initial Study and Proposed Negative Declaration for the Butte Water District 2012 Water Transfer Program (2012; 11 pp);
- Mount Signal and Calexico Solar Farm Projects DEIR (2011; 16 pp);
- City of Elk Grove Sphere of Influence EIR (2011; 28 pp);
- Comment on Sutter Landing Park Solar Photovoltaic Project MND (2011; 9 pp);
- Statement of Shawn Smallwood, Ph.D. Regarding Proposed Rabik/Gudath Project, 22611 Coleman Valley Road, Bodega Bay (CPN 10-0002) (2011; 4 pp);
- Declaration of K. Shawn Smallwood on Biological Impacts of the Ivanpah Solar Electric Generating System (ISEGS) (2011; 9 pp);
- Comments on Draft Eagle Conservation Plan Guidance (2011; 13 pp);
- Comments on Draft EIR/EA for Niles Canyon Safety Improvement Project (2011; 16 pp);
- Declaration of K. Shawn Smallwood, Ph.D., on Biological Impacts of the Route 84 Safety Improvement Project (2011; 7 pp);
- Rebuttal Testimony of Witness #22, K. Shawn Smallwood, Ph.D, on Behalf of Intervenors Friends of The Columbia Gorge & Save Our Scenic Area (2010; 6 pp);
- Prefiled Direct Testimony of Witness #22, K. Shawn Smallwood, Ph.D., on Behalf of

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Intervenors Friends of the Columbia Gorge & Save Our Scenic Area. Comments on Whistling Ridge Wind Energy Power Project DEIS, Skamania County, Washington (2010; 41 pp);

- Evaluation of Klickitat County's Decisions on the Windy Flats West Wind Energy Project (2010; 17 pp);
- St. John's Church Project Draft Environmental Impact Report (2010; 14 pp.);
- Initial Study/Mitigated Negative Declaration for Results Radio Zone File #2009-001 (2010; 20 pp);
- Rio del Oro Specific Plan Project Final Environmental Impact Report (2010;12 pp);
- Answers to Questions on 33% RPS Implementation Analysis Preliminary Results Report (2009: 9 pp);
- SEPA Determination of Non-significance regarding zoning adjustments for Skamania County, Washington. Second Declaration to Friends of the Columbia Gorge, Inc. and Save Our Scenic Area (Dec 2008; 17 pp);
- Comments on Draft 1A Summary Report to CAISO (2008; 10 pp);
- County of Placer's Categorical Exemption of Hilton Manor Project (2009; 9 pp);
- Protest of CARE to Amendment to the Power Purchase and Sale Agreement for Procurement of Eligible Renewable Energy Resources Between Hatchet Ridge Wind LLC and PG&E (2009; 3 pp);
- Tehachapi Renewable Transmission Project EIR/EIS (2009; 142 pp);
- Delta Shores Project EIR, south Sacramento (2009; 11 pp + addendum 2 pp);
- Declaration of Shawn Smallwood in Support of Care's Petition to Modify D.07-09-040 (2008; 3 pp);
- The Public Utility Commission's Implementation Analysis December 16 Workshop for the Governor's Executive Order S-14-08 to implement a 33% Renewable Portfolio Standard by 2020 (2008; 9 pp);
- The Public Utility Commission's Implementation Analysis Draft Work Plan for the Governor's Executive Order S-14-08 to implement a 33% Renewable Portfolio Standard by 2020 (2008; 11 pp);
- Draft 1A Summary Report to California Independent System Operator for Planning Reserve Margins (PRM) Study (2008; 7 pp.);
- SEPA Determination of Non-significance regarding zoning adjustments for Skamania County, Washington. Declaration to Friends of the Columbia Gorge, Inc. and Save Our Scenic Area (Sep 2008; 16 pp);
- California Energy Commission's Preliminary Staff Assessment of the Colusa Generating Station (2007; 24 pp);
- Rio del Oro Specific Plan Project Recirculated Draft Environmental Impact Report (2008: 66 pp);
- Replies to Response to Comments Re: Regional University Specific Plan Environmental Impact Report (2008; 20 pp);
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- Clark Precast, LLC's "Sugarland" project, Negative Declaration (2008: 15 pp.);
- Cape Wind Project Draft Environmental Impact Statement (2008; 157 pp.);
- Yuba Highlands Specific Plan (or Area Plan) Environmental Impact Report (2006; 37 pp.);
- Replies to responses to comments on Mitigated Negative Declaration of the proposed

- Mining Permit (MIN 04-01) and Modification of Use Permit 96-02 at North Table Mountain (2006; 5 pp);
- Mitigated Negative Declaration of the proposed Mining Permit (MIN 04-01) and Modification of Use Permit 96-02 at North Table Mountain (2006; 15 pp);
- Windy Point Wind Farm Environmental Review and EIS (2006; 14 pp and 36 Powerpoint slides in reply to responses to comments);
- Shiloh I Wind Power Project EIR (2005; 18 pp);
- Buena Vista Wind Energy Project Notice of Preparation of EIR (2004; 15 pp);
- Negative Declaration of the proposed Callahan Estates Subdivision (2004; 11 pp);
- Negative Declaration of the proposed Winters Highlands Subdivision (2004; 9 pp);
- Negative Declaration of the proposed Winters Highlands Subdivision (2004; 13 pp);
- Negative Declaration of the proposed Creekside Highlands Project, Tract 7270 (2004; 21 pp);
- On the petition California Fish and Game Commission to list the Burrowing Owl as threatened or endangered (2003; 10 pp);
- Conditional Use Permit renewals from Alameda County for wind turbine operations in the Altamont Pass Wind Resource Area (2003; 41 pp);
- UC Davis Long Range Development Plan of 2003, particularly with regard to the Neighborhood Master Plan (2003; 23 pp);
- Anderson Marketplace Draft Environmental Impact Report (2003: 18 pp + 3 plates of photos);
- Negative Declaration of the proposed expansion of Temple B'nai Tikyah (2003: 6 pp);
- Antonio Mountain Ranch Specific Plan Public Draft EIR (2002: 23 pp);
- Response to testimony of experts at the East Altamont Energy Center evidentiary hearing on biological resources (2002: 9 pp);
- Revised Draft Environmental Impact Report, The Promenade (2002: 7 pp);
- Recirculated Initial Study for Calpine's proposed Pajaro Valley Energy Center (2002: 3 pp);
- UC Merced -- Declaration of Dr. Shawn Smallwood in support of petitioner's application for temporary restraining order and preliminary injunction (2002: 5 pp);
- Replies to response to comments in Final Environmental Impact Report, Atwood Ranch Unit III Subdivision (2003: 22 pp);
- Draft Environmental Impact Report, Atwood Ranch Unit III Subdivision (2002: 19 pp + 8 photos on 4 plates);
- California Energy Commission Staff Report on GWF Tracy Peaker Project (2002: 17 pp + 3 photos; follow-up report of 3 pp);
- Initial Study and Negative Declaration, Silver Bend Apartments, Placer County (2002: 13 pp);
- UC Merced Long-range Development Plan DEIR and UC Merced Community Plan DEIR (2001: 26 pp);
- Initial Study, Colusa County Power Plant (2001: 6 pp);
- Comments on Proposed Dog Park at Catlin Park, Folsom, California (2001: 5 pp + 4 photos);
- Pacific Lumber Co. (Headwaters) Habitat Conservation Plan and Environmental Impact Report (1998: 28 pp);
- Final Environmental Impact Report/Statement for Issuance of Take authorization for listed

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- species within the MSCP planning area in San Diego County, California (Fed. Reg. 62 (60): 14938, San Diego Multi-Species Conservation Program) (1997: 10 pp);
- Permit (PRT-823773) Amendment for the Natomas Basin Habitat Conservation Plan, Sacramento, CA (Fed. Reg. 63 (101): 29020-29021) (1998);
- Draft Recovery Plan for the Giant Garter Snake (*Thamnophis gigas*). (Fed. Reg. 64(176): 49497-49498) (1999: 8 pp);
- Review of the Draft Recovery Plan for the Arroyo Southwestern Toad (Bufo microscaphus californicus) (1998);
- Ballona West Bluffs Project Environmental Impact Report (1999: oral presentation);
- California Board of Forestry's proposed amended Forest Practices Rules (1999);
- Negative Declaration for the Sunset Skyranch Airport Use Permit (1999);
- Calpine and Bechtel Corporations' Biological Resources Implementation and Monitoring Program (BRMIMP) for the Metcalf Energy Center (2000: 10 pp);
- California Energy Commission's Final Staff Assessment of the proposed Metcalf Energy Center (2000);
- US Fish and Wildlife Service Section 7 consultation with the California Energy Commission regarding Calpine and Bechtel Corporations' Metcalf Energy Center (2000: 4 pp);
- California Energy Commission's Preliminary Staff Assessment of the proposed Metcalf Energy Center (2000: 11 pp);
- Site-specific management plans for the Natomas Basin Conservancy's mitigation lands, prepared by Wildlands, Inc. (2000: 7 pp);
- Affidavit of K. Shawn Smallwood in Spirit of the Sage Council, et al. (Plaintiffs) vs. Bruce Babbitt, Secretary, U.S. Department of the Interior, et al. (Defendants), Injuries caused by the No Surprises policy and final rule which codifies that policy (1999: 9 pp).

Comments on other Environmental Review Documents:

- Proposed Regulation for California Fish and Game Code Section 3503.5 (2015: 12 pp);
- Statement of Overriding Considerations related to extending Altamont Winds, Inc.'s Conditional Use Permit PLN2014-00028 (2015; 8 pp);
- Draft Program Level EIR for Covell Village (2005; 19 pp);
- Bureau of Land Management Wind Energy Programmatic EIS Scoping document (2003: 7 pp.);
- NEPA Environmental Analysis for Biosafety Level 4 National Biocontainment Laboratory (NBL) at UC Davis (2003: 7 pp);
- Notice of Preparation of UC Merced Community and Area Plan EIR, on behalf of The Wildlife Society—Western Section (2001: 8 pp.);
- Preliminary Draft Yolo County Habitat Conservation Plan (2001; 2 letters totaling 35 pp.);
- Merced County General Plan Revision, notice of Negative Declaration (2001: 2 pp.);
- Notice of Preparation of Campus Parkway EIR/EIS (2001: 7 pp.);
- Draft Recovery Plan for the bighorn sheep in the Peninsular Range (Ovis candensis) (2000);
- Draft Recovery Plan for the California Red-legged Frog (*Rana aurora draytonii*), on behalf of The Wildlife Society—Western Section (2000: 10 pp.);
- Sierra Nevada Forest Plan Amendment Draft Environmental Impact Statement, on behalf of The Wildlife Society—Western Section (2000: 7 pp.);

- State Water Project Supplemental Water Purchase Program, Draft Program EIR (1997);
- Davis General Plan Update EIR (2000);
- Turn of the Century EIR (1999: 10 pp);
- Proposed termination of Critical Habitat Designation under the Endangered Species Act (Fed. Reg. 64(113): 31871-31874) (1999);
- NOA Draft Addendum to the Final Handbook for Habitat Conservation Planning and Incidental Take Permitting Process, termed the HCP 5-Point Policy Plan (Fed. Reg. 64(45): 11485 - 11490) (1999; 2 pp + attachments);
- Covell Center Project EIR and EIR Supplement (1997).

Position Statements I prepared the following position statements for the Western Section of The Wildlife Society, and one for nearly 200 scientists:

- Recommended that the California Department of Fish and Game prioritize the extermination
 of the introduced southern water snake in northern California. The Wildlife SocietyWestern Section (2001);
- Recommended that The Wildlife Society—Western Section appoint or recommend members
 of the independent scientific review panel for the UC Merced environmental review process
 (2001);
- Opposed the siting of the University of California's 10th campus on a sensitive vernal pool/grassland complex east of Merced. The Wildlife Society--Western Section (2000);
- Opposed the legalization of ferret ownership in California. The Wildlife Society--Western Section (2000);
- Opposed the Proposed "No Surprises," "Safe Harbor," and "Candidate Conservation
 Agreement" rules, including permit-shield protection provisions (Fed. Reg. Vol. 62, No.
 103, pp. 29091-29098 and No. 113, pp. 32189-32194). This statement was signed by 188
 scientists and went to the responsible federal agencies, as well as to the U.S. Senate and
 House of Representatives.

Posters at Professional Meetings

Leyvas, E. and K. S. Smallwood. 2015. Rehabilitating injured animals to offset and rectify wind project impacts. Conference on Wind Energy and Wildlife Impacts, Berlin, Germany, 9-12 March 2015.

Smallwood, K. S., J. Mount, S. Standish, E. Leyvas, D. Bell, E. Walther, B. Karas. 2015. Integrated detection trials to improve the accuracy of fatality rate estimates at wind projects. Conference on Wind Energy and Wildlife Impacts, Berlin, Germany, 9-12 March 2015.

Smallwood, K. S. and C. G. Thelander. 2005. Lessons learned from five years of avian mortality research in the Altamont Pass WRA. AWEA conference, Denver, May 2005.

Neher, L., L. Wilder, J. Woo, L. Spiegel, D. Yen-Nakafugi, and K.S. Smallwood. 2005. Bird's eye view on California wind. AWEA conference, Denver, May 2005.

Smallwood, K. S., C. G. Thelander and L. Spiegel. 2003. Toward a predictive model of avian

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fatalities in the Altamont Pass Wind Resource Area. Windpower 2003 Conference and Convention, Austin, Texas.

Smallwood, K.S. and Eva Butler. 2002. Pocket Gopher Response to Yellow Star-thistle Eradication as part of Grassland Restoration at Decommissioned Mather Air Force Base, Sacramento County, California. White Mountain Research Station Open House, Barcroft Station.

Smallwood, K.S. and Michael L. Morrison. 2002. Fresno kangaroo rat (*Dipodomys nitratoides*) Conservation Research at Resources Management Area 5, Lemoore Naval Air Station. White Mountain Research Station Open House, Barcroft Station.

Smallwood, K.S. and E.L. Fitzhugh. 1989. Differentiating mountain lion and dog tracks. Third Mountain Lion Workshop, Prescott, AZ.

Smith, T. R. and K. S. Smallwood. 2000. Effects of study area size, location, season, and allometry on reported *Sorex* shrew densities. Annual Meeting of the Western Section of The Wildlife Society.

Presentations at Professional Meetings and Seminars

Repowering the Altamont Pass. Altamont Symposium, The Wildlife Society – Western Section, 5 February 2017.

Developing methods to reduce bird mortality in the Altamont Pass Wind Resource Area, 1999-2007. Altamont Symposium, The Wildlife Society – Western Section, 5 February 2017.

Conservation and recovery of burrowing owls in Santa Clara Valley. Santa Clara Valley Habitat Agency, Newark, California, 3 February 2017.

Mitigation of Raptor Fatalities in the Altamont Pass Wind Resource Area. Raptor Research Foundation Meeting, Sacramento, California, 6 November 2015.

From burrows to behavior: Research and management for burrowing owls in a diverse landscape. California Burrowing Owl Consortium meeting, 24 October 2015, San Jose, California.

The Challenges of repowering. Keynote presentation at Conference on Wind Energy and Wildlife Impacts, Berlin, Germany, 10 March 2015.

Research Highlights Altamont Pass 2011-2015. Scientific Review Committee, Oakland, California, 8 July 2015.

Siting wind turbines to minimize raptor collisions: Altamont Pass Wind Resource Area. US Fish and Wildlife Service Golden Eagle Working Group, Sacramento, California, 8 January 2015.

Evaluation of nest boxes as a burrowing owl conservation strategy. Sacramento Chapter of the Western Section, The Wildlife Society. Sacramento, California, 26 August 2013.

Predicting collision hazard zones to guide repowering of the Altamont Pass. Conference on wind

power and environmental impacts. Stockholm, Sweden, 5-7 February 2013.

Impacts of Wind Turbines on Wildlife. California Council for Wildlife Rehabilitators, Yosemite, California, 12 November 2012.

Impacts of Wind Turbines on Birds and Bats. Madrone Audubon Society, Santa Rosa, California, 20 February 2012.

Comparing Wind Turbine Impacts across North America. California Energy Commission Staff Workshop: Reducing the Impacts of Energy Infrastructure on Wildlife, 20 July 2011.

Siting Repowered Wind Turbines to Minimize Raptor Collisions. California Energy Commission Staff Workshop: Reducing the Impacts of Energy Infrastructure on Wildlife, 20 July 2011.

Siting Repowered Wind Turbines to Minimize Raptor Collisions. Alameda County Scientific Review Committee meeting, 17 February 2011

Comparing Wind Turbine Impacts across North America. Conference on Wind energy and Wildlife impacts, Trondheim, Norway, 3 May 2011.

Update on Wildlife Impacts in the Altamont Pass Wind Resource Area. Raptor Symposium, The Wildlife Society—Western Section, Riverside, California, February 2011.

Siting Repowered Wind Turbines to Minimize Raptor Collisions. Raptor Symposium, The Wildlife Society - Western Section, Riverside, California, February 2011.

Wildlife mortality caused by wind turbine collisions. Ecological Society of America, Pittsburgh, Pennsylvania, 6 August 2010.

Map-based repowering and reorganization of a wind farm to minimize burrowing owl fatalities. California burrowing Owl Consortium Meeting, Livermore, California, 6 February 2010.

Environmental barriers to wind power. Getting Real About Renewables: Economic and Environmental Barriers to Biofuels and Wind Energy. A symposium sponsored by the Environmental & Energy Law & Policy Journal, University of Houston Law Center, Houston, 23 February 2007.

Lessons learned about bird collisions with wind turbines in the Altamont Pass and other US wind farms. Meeting with Japan Ministry of the Environment and Japan Ministry of the Economy, Wild Bird Society of Japan, and other NGOs Tokyo, Japan, 9 November 2006.

Lessons learned about bird collisions with wind turbines in the Altamont Pass and other US wind farms. Symposium on bird collisions with wind turbines. Wild Bird Society of Japan, Tokyo, Japan, 4 November 2006.

Responses of Fresno kangaroo rats to habitat improvements in an adaptive management framework. California Society for Ecological Restoration (SERCAL) 13th Annual Conference, UC Santa

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Barbara, 27 October 2006.

Fatality associations as the basis for predictive models of fatalities in the Altamont Pass Wind Resource Area. EEI/APLIC/PIER Workshop, 2006 Biologist Task Force and Avian Interaction with Electric Facilities Meeting, Pleasanton, California, 28 April 2006.

Burrowing owl burrows and wind turbine collisions in the Altamont Pass Wind Resource Area. The Wildlife Society - Western Section Annual Meeting, Sacramento, California, February 8, 2006.

Mitigation at wind farms. Workshop: Understanding and resolving bird and bat impacts. American Wind Energy Association and Audubon Society. Los Angeles, CA. January 10 and 11, 2006.

Incorporating data from the California Wildlife Habitat Relationships (CWHR) system into an impact assessment tool for birds near wind farms. Shawn Smallwood, Kevin Hunting, Marcus Yee, Linda Spiegel, Monica Parisi. Workshop: Understanding and resolving bird and bat impacts. American Wind Energy Association and Audubon Society. Los Angeles, CA. January 10 and 11, 2006.

Toward indicating threats to birds by California's new wind farms. California Energy Commission, Sacramento, May 26, 2005.

Avian collisions in the Altamont Pass. California Energy Commission, Sacramento, May 26, 2005.

Ecological solutions for avian collisions with wind turbines in the Altamont Pass Wind Resource Area. EPRI Environmental Sector Council, Monterey, California, February 17, 2005.

Ecological solutions for avian collisions with wind turbines in the Altamont Pass Wind Resource Area. The Wildlife Society—Western Section Annual Meeting, Sacramento, California, January 19, 2005.

Associations between avian fatalities and attributes of electric distribution poles in California. The Wildlife Society - Western Section Annual Meeting, Sacramento, California, January 19, 2005.

Minimizing avian mortality in the Altamont Pass Wind Resources Area. UC Davis Wind Energy Collaborative Forum, Palm Springs, California, December 14, 2004.

Selecting electric distribution poles for priority retrofitting to reduce raptor mortality. Raptor Research Foundation Meeting, Bakersfield, California, November 10, 2004.

Responses of Fresno kangaroo rats to habitat improvements in an adaptive management framework. Annual Meeting of the Society for Ecological Restoration, South Lake Tahoe, California, October 16, 2004.

Lessons learned from five years of avian mortality research at the Altamont Pass Wind Resources Area in California. The Wildlife Society Annual Meeting, Calgary, Canada, September 2004.

The ecology and impacts of power generation at Altamont Pass. Sacramento Petroleum Association,

Sacramento, California, August 18, 2004.

Burrowing owl mortality in the Altamont Pass Wind Resource Area. California Burrowing Owl Consortium meeting, Hayward, California, February 7, 2004.

Burrowing owl mortality in the Altamont Pass Wind Resource Area. California Burrowing Owl Symposium, Sacramento, November 2, 2003.

Raptor Mortality at the Altamont Pass Wind Resource Area. National Wind Coordinating Committee, Washington, D.C., November 17, 2003.

Raptor Behavior at the Altamont Pass Wind Resource Area. Annual Meeting of the Raptor Research Foundation, Anchorage, Alaska, September, 2003.

Raptor Mortality at the Altamont Pass Wind Resource Area. Annual Meeting of the Raptor Research Foundation, Anchorage, Alaska, September, 2003.

California mountain lions. Ecological & Environmental Issues Seminar, Department of Biology, California State University, Sacramento, November, 2000.

Intra- and inter-turbine string comparison of fatalities to animal burrow densities at Altamont Pass. National Wind Coordinating Committee, Carmel, California, May, 2000.

Using a Geographic Positioning System (GPS) to map wildlife and habitat. Annual Meeting of the Western Section of The Wildlife Society, Riverside, CA, January, 2000.

Suggested standards for science applied to conservation issues. Annual Meeting of the Western Section of The Wildlife Society, Riverside, CA, January, 2000.

The indicators framework applied to ecological restoration in Yolo County, California. Society for Ecological Restoration, September 25, 1999.

Ecological restoration in the context of animal social units and their habitat areas. Society for Ecological Restoration, September 24, 1999.

Relating Indicators of Ecological Health and Integrity to Assess Risks to Sustainable Agriculture and Native Biota. International Conference on Ecosystem Health, August 16, 1999.

A crosswalk from the Endangered Species Act to the HCP Handbook and real HCPs. Southern California Edison, Co. and California Energy Commission, March 4-5, 1999.

Mountain lion track counts in California: Implications for Management. Ecological & Environmental Issues Seminar, Department of Biological Sciences, California State University, Sacramento, November 4, 1998.

"No Surprises" -- Lack of science in the HCP process. California Native Plant Society Annual Conservation Conference, The Presidio, San Francisco, September 7, 1997.

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In Your Interest. A half hour weekly show aired on Channel 10 Television, Sacramento. In this episode, I served on a panel of experts discussing problems with the implementation of the Endangered Species Act. Aired August 31, 1997.

Spatial scaling of pocket gopher (*Geomyidae*) density. Southwestern Association of Naturalists 44th Meeting, Fayetteville, Arkansas, April 10, 1997.

Estimating prairie dog and pocket gopher burrow volume. Southwestern Association of Naturalists 44th Meeting, Fayetteville, Arkansas, April 10, 1997.

Ten years of mountain lion track survey. Fifth Mountain Lion Workshop, San Diego, February 27, 1996.

Study and interpretive design effects on mountain lion density estimates. Fifth Mountain Lion Workshop, San Diego, February 27, 1996.

Small animal control. Session moderator and speaker at the California Farm Conference, Sacramento, California, Feb. 28, 1995.

Small animal control. Ecological Farming Conference, Asylomar, California, Jan. 28, 1995.

Habitat associations of the Swainson's Hawk in the Sacramento Valley's agricultural landscape. 1994 Raptor Research Foundation Meeting, Flagstaff, Arizona.

Alfalfa as wildlife habitat. Seed Industry Conference, Woodland, California, May 4, 1994.

Habitats and vertebrate pests: impacts and management. Managing Farmland to Bring Back Game Birds and Wildlife to the Central Valley. Yolo County Resource Conservation District, U.C. Davis, February 19, 1994.

Management of gophers and alfalfa as wildlife habitat. Orland Alfalfa Production Meeting and Sacramento Valley Alfalfa Production Meeting, February 1 and 2, 1994.

Patterns of wildlife movement in a farming landscape. Wildlife and Fisheries Biology Seminar Series: Recent Advances in Wildlife, Fish, and Conservation Biology, U.C. Davis, Dec. 6, 1993.

Alfalfa as wildlife habitat. California Alfalfa Symposium, Fresno, California, Dec. 9, 1993.

Management of pocket gophers in Sacramento Valley alfalfa. California Alfalfa Symposium, Fresno, California, Dec. 8, 1993.

Association analysis of raptors in a farming landscape. Plenary speaker at Raptor Research Foundation Meeting, Charlotte, North Carolina, Nov. 6, 1993.

Landscape strategies for biological control and IPM. Plenary speaker, International Conference on Integrated Resource Management and Sustainable Agriculture, Beijing, China, Sept. 11, 1993.

Landscape Ecology Study of Pocket Gophers in Alfalfa. Alfalfa Field Day, U.C. Davis, July 1993.

Patterns of wildlife movement in a farming landscape. Spatial Data Analysis Colloquium, U.C. Davis, August 6, 1993.

Sound stewardship of wildlife. Veterinary Medicine Seminar: Ethics of Animal Use, U.C. Davis. May 1993.

Landscape ecology study of pocket gophers in alfalfa. Five County Grower's Meeting, Tracy, California. February 1993.

Turbulence and the community organizers: The role of invading species in ordering a turbulent system, and the factors for invasion success. Ecology Graduate Student Association Colloquium, U.C. Davis. May 1990.

Evaluation of exotic vertebrate pests. Fourteenth Vertebrate Pest Conference, Sacramento, California. March 1990.

Analytical methods for predicting success of mammal introductions to North America. The Western Section of the Wildlife Society, Hilo, Hawaii. February 1988.

A state-wide mountain lion track survey. Sacramento County Dept Parks and Recreation. April 1986.

The mountain lion in California. Davis Chapter of the Audubon Society. October 1985.

Ecology Graduate Student Seminars, U.C. Davis, 1985-1990: Social behavior of the mountain lion; Mountain lion control; Political status of the mountain lion in California.

Other forms of Participation at Professional Meetings

- Scientific Committee, Conference on Wind energy and Wildlife impacts, Berlin, Germany, March 2015.
- Scientific Committee, Conference on Wind energy and Wildlife impacts, Stockholm, Sweden, February 2013.
- Workshop co-presenter at Birds & Wind Energy Specialist Group (BAWESG) Information sharing week, Bird specialist studies for proposed wind energy facilities in South Africa, Endangered Wildlife Trust, Darling, South Africa, 3-7 October 2011.
- Scientific Committee, Conference on Wind energy and Wildlife impacts, Trondheim, Norway, 2-5 May 2011.
- Chair of Animal Damage Management Session, The Wildlife Society, Annual Meeting, Reno, Nevada, September 26, 2001.

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 Chair of Technical Session: Human communities and ecosystem health: Comparing perspectives and making connection. Managing for Ecosystem Health, International Congress on Ecosystem Health, Sacramento, CA August 15-20, 1999.

- Student Awards Committee, Annual Meeting of the Western Section of The Wildlife Society, Riverside, CA, January, 2000.
- Student Mentor, Annual Meeting of the Western Section of The Wildlife Society, Riverside, CA, January, 2000.

Printed Mass Media

Smallwood, K.S., D. Mooney, and M. McGuinness. 2003. We must stop the UCD biolab now. Op-Ed to the Davis Enterprise.

Smallwood, K.S. 2002. Spring Lake threatens Davis. Op-Ed to the Davis Enterprise.

Smallwood, K.S. Summer, 2001. Mitigation of habitation. The Flatlander, Davis, California.

Entrikan, R.K. and K.S. Smallwood. 2000. Measure O: Flawed law would lock in new taxes. Op-Ed to the Davis Enterprise.

Smallwood, K.S. 2000. Davis delegation lobbies Congress for Wildlife conservation. Op-Ed to the Davis Enterprise.

Smallwood, K.S. 1998. Davis Visions. The Flatlander, Davis, California.

Smallwood, K.S. 1997. Last grab for Yolo's land and water. The Flatlander, Davis, California.

Smallwood, K.S. 1997. The Yolo County HCP. Op-Ed to the Davis Enterprise.

Radio/Television

PBS News Hour,

FOX News, Energy in America: Dead Birds Unintended Consequence of Wind Power Development, August 2011.

KXJZ Capital Public Radio -- Insight (Host Jeffrey Callison). Mountain lion attacks (with guest Professor Richard Coss). 23 April 2009;

KXJZ Capital Public Radio -- Insight (Host Jeffrey Callison). Wind farm Rio Vista Renewable Power. 4 September 2008;

KQED QUEST Episode #111. Bird collisions with wind turbines. 2007;

KDVS Speaking in Tongues (host Ron Glick), Yolo County HCP: 1 hour. December 27, 2001;

KDVS Speaking in Tongues (host Ron Glick), Yolo County HCP: 1 hour. May 3, 2001;

KDVS Speaking in Tongues (host Ron Glick), Yolo County HCP: 1 hour. February 8, 2001;

KDVS Speaking in Tongues (host Ron Glick & Shawn Smallwood), California Energy Crisis: 1 hour. Jan. 25, 2001;

KDVS Speaking in Tongues (host Ron Glick), Headwaters Forest HCP: 1 hour. 1998;

Davis Cable Channel (host Gerald Heffernon), Burrowing owls in Davis: half hour. June, 2000;

Davis Cable Channel (hosted by Davis League of Women Voters), Measure O debate: 1 hour. October, 2000;

KXTV 10, In Your Interest, The Endangered Species Act: half hour. 1997.

Reviews of Journal Papers (Scientific journals for whom I've provided peer review)

Journal	Journal			
American Naturalist	Journal of Animal Ecology			
Journal of Wildlife Management	Western North American Naturalist			
Auk	Journal of Raptor Research			
Biological Conservation	National Renewable Energy Lab reports			
Canadian Journal of Zoology	Oikos			
Ecosystem Health	The Prairie Naturalist			
Environmental Conservation	Restoration Ecology			
Environmental Management	Southwestern Naturalist			
Functional Ecology	The Wildlife SocietyWestern Section Trans.			
Journal of Zoology (London)	Proc. Int. Congress on Managing for Ecosystem Health			
Journal of Applied Ecology	Transactions in GIS			
Ecology	Tropical Ecology			
Wildlife Society Bulletin	Peer J			
Biological Control	The Condor			

Committees

- Scientific Review Committee, Alameda County, Altamont Pass Wind Resource Area
- Ph.D. Thesis Committee, Steve Anderson, University of California, Davis
- MS Thesis Committee, Marcus Yee, California State University, Sacramento

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Other Professional Activities or Products

Testified in Federal Court in Denver during 2005 over the fate of radio-nuclides in the soil at Rocky Flats Plant after exposure to burrowing animals. My clients won a judgment of \$553,000,000. I have also testified in many other cases of litigation under CEQA, NEPA, the Warren-Alquist Act, and other environmental laws. My clients won most of the cases for which I testified.

Testified before Environmental Review Tribunals in Ontario, Canada regarding proposed White Pines, Amherst Island, and Fairview Wind Energy projects.

Testified in Skamania County Hearing in 2009 on the potential impacts of zoning the County for development of wind farms and hazardous waste facilities.

Testified in deposition in 2007 in the case of O'Dell et al. vs. FPL Energy in Houston, Texas.

Testified in Klickitat County Hearing in 2006 on the potential impacts of the Windy Point Wind Farm.

Memberships in Professional Societies

The Wildlife Society Raptor Research Foundation

Honors and Awards

J.G. Boswell Full Academic Scholarship, 1981 college of choice
Certificate of Appreciation, The Wildlife Society—Western Section, 2000, 2001
Northern California Athletic Association Most Valuable Cross Country Runner, 1984
American Legion Award, Corcoran High School, 1981, and John Muir Junior High, 1977
CIF Section Champion, Cross Country in 1978
CIF Section Champion, Track & Field 2 mile run in 1981
National Junior Record, 20 kilometer run, 1982
National Age Group Record, 1500 meter run, 1978

Community Activities

District 64 Little League Umpire, 2003-2007 Dixon Little League Umpire, 2006-07

Davis Little League Chief Umpire and Board member, 2004-2005

Davis Little League Safety Officer, 2004-2005

Davis Little League Certified Umpire, 2002-2004

Davis Little League Scorekeeper, 2002

Davis Visioning Group member

Petitioner for Writ of Mandate under the California Environmental Quality Act against City of Woodland decision to approve the Spring Lake Specific Plan, 2002

Served on campaign committees for City Council candidates

Representative Clients/Funders

Law Offices of Stephan C. Volker EDF Renewables

Blum Collins, LLP National Renewable Energy Lab

Eric K. Gillespie Professional Corporation Altamont Winds LLC

Law Offices of Berger & Montague Salka Energy

Lozeau | Drury LLP Comstocks Business (magazine)
Law Offices of Roy Haber BioResource Consultants

Law Offices of Edward MacDonald

Law Office of John Gabrielli

Black and Veatch

Law Office of Bill Kopper Terry Preston, Wildlife Ecology Research Center

Law Office of Donald B. Mooney EcoStat, Inc. Law Office of Veneruso & Moncharsh US Navy

Law Office of Steven Thompson US Department of Agriculture

Law Office of Brian Gaffney US Forest Service

California Wildlife Federation

Defenders of Wildlife

Sierra Club

US Fish & Wildlife Service

US Department of Justice

California Energy Commission

National Endangered Species Network
Spirit of the Sage Council
The Humane Society
California Department of Fish & Wildlife
California Department of Transportation
Hagens Berman LLP
California Department of Transportation
California Department of Forestry

Environmental Protection Information Center
Goldberg, Kamin & Garvin, Attorneys at Law

California Department of Food & Agriculture
Ventura County Counsel

Californians for Renewable Energy (CARE) County of Yolo

Seatuck Environmental Association Tahoe Regional Planning Agency
Friends of the Columbia Gorge, Inc. Sustainable Agriculture Research & Education Program

Save Our Scenic Area Sacramento-Yolo Mosquito and Vector Control District

Alliance to Protect Nantucket Sound East Bay Regional Park District

Friends of the Swainson's Hawk
Alameda Creek Alliance
Center for Biological Diversity
California Native Plant Society

County of Alameda
Don & LaNelle Silverstien
Seventh Day Adventist Church
Escuela de la Raza Unida

Endangered Wildlife Trust

and BirdLife South Africa

Susan Pelican and Howard Beeman

Residents Against Inconsistent Development, Inc.

AquAlliance Bob Sarvey
Oregon Natural Desert Association Mike Boyd

Save Our Sound Hillcroft Neighborhood Fund

G3 Energy and Pattern Energy Joint Labor Management Committee, Retail Food Industry

Emerald Farms Lisa Rocca
Pacific Gas & Electric Co. Kevin Jackson

Southern California Edison Co. Dawn Stover and Jay Letto

Georgia-Pacific Timber Co. Nancy Havassy

Northern Territories Inc.

Catherine Portman (for Brenda Cedarblade)

David Magney Environmental Consulting

Ventus Environmental Solutions, Inc.

Wildlife History Foundation Panorama Environmental, Inc.

NextEra Energy Resources, LLC Adams Broadwell Professional Corporation

Ogin, Inc.

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Representative special-status species experience

Common name	Species name	Description			
Field experience					
California red-legged frog	Rana aurora draytonii	Protocol searches; Many detections			
Foothill yellow-legged frog	Rana boylii	Presence surveys; Many detections			
Western spadefoot	Spea hammondii	Presence surveys; Few detections			
California tiger salamander	Ambystoma californiense	Protocol searches; Many detections			
Coast range newt	Taricha torosa torosa	Searches and multiple detections			
Blunt-nosed leopard lizard	Gambelia sila	Detected in San Luis Obispo County			
California horned lizard	Phrynosoma coronatum frontale	Searches; Many detections			
Western pond turtle	Clemmys marmorata	Searches; Many detections			
San Joaquin kit fox	Vulpes macrotis mutica	Protocol searches; detections			
Sumatran tiger	Panthera tigris	Track surveys in Sumatra			
Mountain lion	Puma concolor californicus	Research and publications			
Point Arena mountain beaver	Aplodontia rufa nigra	Remote camera operation			
Giant kangaroo rat	Dipodomys ingens	Detected in Cholame Valley			
San Joaquin kangaroo rat	Dipodomys nitratoides	Monitoring & habitat restoration			
Monterey dusky-footed woodrat	Neotoma fuscipes luciana	Non-target captures and mapping of dens			
Salt marsh harvest mouse	Reithrodontomys raviventris	Habitat assessment, monitoring			
Salinas harvest mouse	Reithrodontomys megalotus	Captures; habitat assessment			
	distichlus	ASSESSED AND SACROSS ASSESSED AND STREET AND SACROSS AND SACROSS ASSESSED ASSESSE			
Bats		Thermal imaging surveys			
California clapper rail	Rallus longirostris	Surveys and detections			
Golden eagle	Aquila chrysaetos	Numerical & behavioral surveys			
Swainson's hawk	Buteo swainsoni	Numerical & behavioral surveys			
Northern harrier	Circus cyaeneus	Numerical & behavioral surveys			
White-tailed kite	Elanus leucurus	Numerical & behavioral surveys			
Loggerhead shrike	Lanius ludovicianus	Large area surveys			
Least Bell's vireo	Vireo bellii pusillus	Detected in Monterey County			
Willow flycatcher	Empidonax traillii extimus	Research at Sierra Nevada breeding sites			
Burrowing owl	Athene cunicularia hypugia	Numerical & behavioral surveys			
Valley elderberry longhorn	Desmocerus californicus	Monitored success of relocation and habita			
beetle	dimorphus	restoration			
Analytical	•				
Arroyo southwestern toad	Bufo microscaphus californicus	Research and report.			
Giant garter snake	Thamnophis gigas	Research and publication			
Northern goshawk	Accipiter gentilis	Research and publication			
Northern spotted owl	Strix occidentalis	Research and reports			
Alameda whipsnake	Masticophis lateralis euryxanthus	Expert testimony			

EXHIBIT C

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Providing expertise in agricultural science, management, & appraisal since 1977. 1105 Kennedy Place Suite 1 Davis, California 95616 telephone +1 530 753-3361

To: Kendra Hartmann, Adams Broadwell Joseph & Cardozo PC, Attorneys at Law

From: Gregory and Henry House

Re: Initial comment on the Draft Environmental Impact Report: Brawley Solar Energy Facility

Project

Dear Ms. Hartmann:

At your request, we have briefly examined the analysis of agricultural issues within the draft EIR entitled *Draft Environmental Impact Report: Brawley Solar Energy Facility Project · SCH No. 2021070424 · Imperial County, California · December 2021* (hereinafter, the *DEIR*).

1 Introduction. The DEIR's section 3.3 ("Agricultural Resources") discusses agricultural impacts of this proposed project of a solar-generation facility with associated battery-storage system and transmission equipment near Brawley, California (hereinafter, the *Brawley project*). This memorandum provides our initial comments on the DEIR with a focus on its section 3.3, which discusses agricultural impacts.

According to the DEIR: "The project site is located on approximately 227 acres of privately-owned land in the unincorporated area of Imperial County, California. . . . Currently, the project site contains alfalfa fields within different levels of harvest. North and east of the project site is undeveloped agricultural land. South of the project site is a mixture of undeveloped agricultural land and dirt lots used for staging activities. The Del Rio Country Club golf course is located to the south of the site. The City of Brawley Wastewater Treatment Plant is located along the western edge of the project site. . . . The entire project site (APNs 037-140-020, 037-140-021, 037-140-022, 037-140-023, and 037-140-006) is located outside of the RE Overlay Zone"—i.e., the zoning designation necessary to permit the project's proposed use. "Therefore, the applicant is requesting a General Plan Amendment to include/classify all five project parcels into the RE Overlay Zone."

We cannot find a definite statement of the project's anticipated duration within the DEIR. We have assumed, for purposes of analysis, that this project's planned duration at time of construction would be twenty-five to thirty years, based on our experience with similar projects.

- 2 Brawley project not consistent with applicable general-plan policies for agricultural lands. The DEIR states in its table 3.3-2 (captioned "Project Consistency with Applicable General Plan Agricultural Policies") that the Brawley project is consistent with the county's general-plan goals regarding farmland preservation. We cannot agree.
- 2.1 General plan goal 1: Preservation of important farmland. The DEIR states in table 3.3-2 that the project is consistent with the county's general-plan goal that all important

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farmland be reserved for agricultural uses* because the Brawley project would only temporarily convert farmland. The DEIR states: "A reclamation plan when the project is decommissioned at the end of its life spans will be utilized." That analysis is incorrect, as its supporting assertion is contradicted within the same DEIR under its section 2.6 ("Restoration of the Project Site"). That section states:

At the end of the PPA term, the owner of the facility may choose to enter into a subsequent PPA, update technology and re-commission, or decommission and remove the generating facility and its components. Upon decommissioning, the site could be converted to other uses in accordance with applicable land use regulations in effect at that time. A collection and recycling program will be executed to promote recycling of project components and minimize disposal in landfills. All permits related to decommissioning would be obtained, where required.

This is plainly neither a plan nor even a commitment in principle to restore the site to agricultural use. A subsequent section of the DEIR does propose reclamation as a mitigation measure, entitled "AG-1b Site Reclamation Plan", but without any definite timeline for when such decommissioning and subsequent reclamation shall occur. Thus, the Brawley project is not temporary unless as a condition of its approval decommissioning and reclamation as of a specific date is required. Furthermore, mitigation measure AG-1b is insufficient as even given a scheduled decommissioning commitment it would not provide any temporary mitigation during the temporary existence of the project. We discuss this issue further in section 4.

2.2 General Plan goal 2: No leapfrog development. The DEIR states in the same table 3.3-2 ("Project Consistency with Applicable General Plan Agricultural Policies") that the Brawley project is consistent with the county's general-plan goal that no "leapfrog" or "checkerboard" development occur† because: "The project is located adjacent to the City of Brawley Wastewater Treatment Plant along the western edge of the project site." That conclusion is incorrect, as the wastewater-treatment plant is itself separated from the City of Brawley, and thus any new development adjacent to the treatment plant but not also adjacent on another of its sides to the City of Brawley does indeed meet the common-sense definition of "checkerboard" development.

The DEIR further states that "with the approval of a General Plan Amendment, Zone Change, and CUP, the project would be consistent with the County's Land Use Ordinance. Consistency with the Land Use Ordinance implies consistency with the General Plan land use designation." This is circular logic, a tautology that is true by definition. It misleadingly misstates the project's inconsistency with the existing general plan and land-use ordinance.

3 DEIR fails to address degradation of soil quality during project's duration. The proposed project will alter existing soil physical, chemical, and biological properties throughout the term of the project. Our concerns center on the likelihood of soil salinification caused by the project's inadequate plans for water management and the lack of a measurable baseline to determine how and to what degree the soil should be restored after decommissioning.

In order to quantitatively assess soil quality and ensure that any reclamation plan will be sufficient to restore the project site to its existing pre-project land use of important farmland, a

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F C-3

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^{*} To wit: "Goal 1. All Important Farmland, including the categories of Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance, as defined by federal and state agencies, should be reserved for agricultural uses."

[†] To wit: "Goal 2. Adopt policies that prohibit "leapfrogging" or "checkerboard" patterns of nonagricultural development in agricultural areas and confine future urbanization to adopted Sphere of Influence area."

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standardized methodology should be established and conducted regularly, to include monitoring and recording the overall site characterization, the soil's respiration, rate of water infiltration, bulk density, electrical conductivity (a measure of salinification), soil pH and nitrate level, aggregate stability, slake test, earthworm test, depth of topsoil, and plant-rooting depth. To ensure that any reclamation plan is adequate to restore the subject property to its pre-project quality of prime farmland, these soil-quality parameters should be measured before, during, and following the subject project's decommissioning and removal. The purpose of establishing baseline soil-quality parameters is to define the soil's current capacity to perform basic functions. Quantitative monitoring of soil-quality parameters is the best method to ensure that any proposed mitigation methodology and timeline is based upon actual soil characteristics of the site throughout the subject project's term.

In our opinion, significant soil quality degradation is likely to occur during the anticipated twenty-five- to thirty-year project window, including salinification, compaction, and loss of organic matter.

We are particularly concerned about salinification as the DEIR does not address the salt content of the water that will be used to wash the panels: "Estimated annual water consumption for operation and maintenance of the proposed project, including periodic PV module washing and fire suppression, would be approximately 3.1-acre feet per year (AFY), which would be supplied to the project site via the adjacent Best Canal and trucked to the project site as needed." §

Why would the effects of this wash water be any different from the water that currently irrigates the project site's existing agricultural crops, which, we assume, also comes from the Best Canal? The answer lies in the quantity of water applied to the soil. Small amounts of water, such as the runoff from washing of the PV panels, will be insufficient to leach the applied salts below the root zone in the soil profile. Increasing soil salinity can be prevented by applying more water to the field than can be retained in the root zone of crops, forcing leaching to occur. The water percolates downward, carrying the salts, thereby preventing excessive accumulation and future salinity issues.

It is evident from reading the DEIR that salinity management has not been considered.

4 Temporary nature of the subject project. If permitted, it can reasonably be assumed that the proposed project will use the land for at least twenty-five years. There is no potential for crop production on the property during this time period. The DEIR fails to consider the increasing unlikelihood that this land will be converted back to agricultural use at that future time when so much of Imperial County has now been converted to solar farms and the infrastructure to continue using these lands for solar farms is already in place. Solar farms and solar-power-conveyance infrastructure in Imperial Valley have reached a tipping point in which it is inconceivable that all of these facilities will be eventually torn down and returned to agricultural use.

Although the DEIR asserts that the subject project is temporary in nature, a closer look at the DEIR reveals there is no definite timetable for decommissioning and site restoration; the document's entire analysis of agricultural impacts is predicated on the expectation that it will be decommissioned in the future, but there is no guarantee that the project is temporary. We cannot find any proposed timeline for decommissioning. The DEIR is silent as to the possibility that

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F C-5

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[‡] For further information on these soil-quality parameters and their measurement, see Soil Quality Test Kit Guide, The Soil Quality Institute of the USDA Natural Resources Conservation Service, (http://soils.usda.gov/sqi).

DEIR section 2.5.1, "Water Use"

Appendix H of the DEIR (page 55) indicates that untreated Colorado River water will be supplied to the project site via the Best Canal under an Industrial Water Supply Agreement with Imperial Irrigation District (IID). Colorado River water has a noted salinity issue that requires management; see, for example, the Colorado River District's article Salinity—Challenges Facing the Colorado River Basin, (https://www.coloradoriverdistrict.org/water-quality/salinity/).

market demand for power from the project might continue or even increase, that the aging plant might be refurbished, etc.

Given the investment in infrastructure by the power company to connect to the subject project, however, and given the likelihood that power needs in California will continue to increase in the coming decades, an economic incentive would appear to exist for the solar facility to operate at the site for at least the foreseeable future. Unlike geothermal energy plants, which have limited effective lifetimes, a solar facility will never deplete its energy source and may continue in operation for as long as its panels are maintained. While individual solar panels may wear out, that does not mean that the solar facility has a finite lifespan. Panels may be repaired, replaced, or upgraded over time, allowing indefinite use of the parcel for this purpose. This opinion is shared by the California Farm Bureau. Consultant Gregory House has spoken to John Gamper, Director of Taxation and Land Use for the California Farm Bureau in Sacramento. Mr. Gamper stated that it is the opinion of the California Farm Bureau that photovoltaic power projects are not temporary, regardless of the time frame of an initial power-purchase agreement, and that therefore the erection of solar photovoltaic projects on agricultural land constitutes permanent loss of farmland in California.

To understand how this might occur, consider one of the oldest photovoltaic-generation facilities in the United States, located in Davis, California. This 86-acre project was originally installed in 1986 by Pacific Gas and Electric Company as a research facility, and subsequently commercially operated from 2003 to generate 650 kW of power by the companies Clean Energy Assets and CleanPath Ventures. CleanPath received permission from the Davis City Council in 2010 to expand power production to as much as 15 MW. Thus, this project, upon reaching the end of its originally planned useful life (approximately twenty-five years in 2012), was not being decommissioned in 2012 but was instead being refurbished and expanded for continued use into the indefinite future.

4.1 Reclamation plan unknown. If the Brawley project is decommissioned after twenty-five to thirty years, it is improbable that the subject land will be in a physical state capable of immediately returning to crop production. The DEIR gives no description of the future reclamation. A definite, detailed reclamation plan is essential for this subject project to be, in fact, temporary. Issues that any reclamation plan must address include the timing and cost of the individual project components' removal and demolition and the question of future water availability.

Timing and cost of the individual project components' removal and demolition. The timing of the individual project components' removal and demolition are needed in a viable reclamation plan, together with their costs so that the dollar amount of the reclamation bond can be accurately assessed. We anticipate that soil restoration, a necessary component of any reclamation plan, cannot begin until all of the project buildings and installations are removed, including any pylons or concrete footings installed below ground, hazardous materials, and contaminated soil. We cannot therefore expect any soil restoration to begin sooner than one year after decommissioning, and perhaps as long as nearly two years after. This adds to the years of crop-production losses beyond the operating years of the project. From our experience, restoring soil tilth to severely disturbed and degraded soils is not an immediate process; it will likely take a minimum of three years, and possibly more, to restore the site to its former productivity, further adding to the years of crop-production losses. This is a strong disincentive, in fact, to ever return the land to agricultural uses.

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F C-5 cont'd

F C-6

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Question of water availability after twenty-five to thirty years. As water is at a premium in California and the project intends to use much less water than the amount used for crop production on the property (the DEIR estimates 3.1 acre-feet per year), there is no guarantee that Imperial Irrigation District will not reallocate the irrigation water currently used by the subject property's crops to another use that is not for crop production. Water is a valuable commodity in high demand. This water will not go unused. Water sales and transfers are now relatively common in California, and many of these sales and transfers are to municipal and industrial uses in far-away places. Permanent loss of this water from the subject property is a distinct possibility.

F C-7

Temporary mitigation is feasible. Because the subject project will last at least twenty-five years, and likely substantially longer, crop production will be lost for this time, and the subject project may cause cumulative impacts. There is no reason why the subject project cannot be mitigated on a temporary basis, with a conservation easement that would run concurrent with the project's timeline. This is the position of many municipalities. For example, the City of Davis, a noted leader in California in agricultural-preservation policies, and the location of the abovementioned solar project that was refurbished and continued at the end of its originally planned life, developed a policy requiring that a conservation easement be placed on another nearby agricultural property of similar size, important-farmland standing, and threat status with respect to future path of development for the duration of a solar installation. As mitigation by conservation easement is feasible, the Brawley project should adhere to a similar standard. Payment of an in-lieu fee or dedication of an easement elsewhere in the county outside the path foreseeable development would fail to mitigate like for like.

F C-8

5 Conclusion. The DEIR's analysis contains logical errors leading to inaccurate conclusions that the subject Brawley project is consistent with the agricultural element of the current general plan of Imperial County. In fact, the proposed project is inconsistent with the general plan's agriculturalpreservation policies. The DEIR claims without support that the project is temporary, failing to provide a reclamation plan or any assurance that the project will in fact be decommissioned in the future and will not be refurbished indefinitely. Based on our consulting experience, we opine that the proposed Brawley project is a de facto permanent loss of farmland, a position shared by the California Farm Bureau. Neither a definite timeline for decommissioning and reclamation is proposed nor is the likelihood of future renewal versus decommissioning analyzed. The DEIR fails to consider impacts to the subject project site's soils, notably with regard to the likelihood of soil salinification.

F C-9

This concludes the initial comments of House Agricultural Consultants regarding this DEIR. A description of our qualifications as consultants is included in an appendix to this memorandum.

F C-10

Sincerely,

Henry House

Gregory A. House

Mitch Sears, Sustainability Programs Manager, City of Davis, personal communication to Greg House, July 31, 2012; Tracie Reynolds, Manager, Leases and Open Space Program, City of Davis, personal communication to Henry House, various dates in 2020 through 2021.

Herry you Jens Alto

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 ${\bf 6}$ $\,$ Appendix: Qualifications of House Agricultural Consultants.

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Gregory A. House

Agricultural Consultant Agronomist Professional Farm Manager Rural Appraiser Farmer

Experience

Agricultural Consultant, House Agricultural Consultants, providing agricultural science, economics, management, and appraisal services, 1983-present

Farmer, 1987-present. Organic apples, peaches, cherries, apricots, field and seed crops

 $\textbf{Corporation Secretary \& Consulting Agronomist}, \\ \textbf{Hannesson}, \\ \textbf{Riddle \& Associates}, \\ \textbf{Inc.}, \\ 1977-1983.$

Professional Affiliations

- · American Society of Farm Managers & Rural Appraisers
- · American Society of Agronomy
- Crop Science Society of America
- Soil Science Society of America
- California Certified Organic Farmers
- California Farm Bureau

Accreditations

- Accredited Farm Manager (AFM), American Society of Farm Managers & Rural Appraisers, Certificate #501
- Certified Professional Agronomist (CPAg), American Registry of Certified Professionals in Agronomy, Crops. & Soils, Ltd. Certificate # 2319
- Certified Crop Advisor CCA), American Registry of Certified Professionals in Agronomy, Crops. & Soils, Ltd.
- Accredited Rural Appraiser (ARA), American Society of Farm Managers & Rural Appraisers, Certificate #749
- Certified General Appraiser, State of California License # AG 001999
 These credentials have continuing education requirements with which I am in compliance.

Education

- B.S., Crop Ecology, University of California, Davis, 1975, with Honors
- Numerous courses from the University of California Extension in agricultural economics, crop management, real estate, & hazardous waste management
- Cornell University Certificate Program, Implementing Good Agricultural Practices: A Key to Produce Safety
- Courses of the American Society of Farm Managers and Rural Appraisers:

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Principles of Rural Appraisal
Advanced Rural Appraisal
Eminent Domain
Report Writing School
Economics of Farm Management
Principles of Farm Management
Standards and Ethics
Permanent Plantings Seminar
Standards and Ethics for Farm Managers
ASFMRA Code of Ethics
National Uniform Standards of Professional Appraisal Practice

Courses of the Appraisal Institute:

Basic Valuation Procedures
Real Estate Statistics and Valuation Modeling
Advanced Income Capitalization
Valuation of Conservation Easements Certificate Program
Condemnation Appraising: Principles and Applications
Appraising the Appraisal
How Tenants Create or Destroy Value: Leasehold Valuation and Its Impact on Value

Expert Witness Court Testimony

- Superior Court Qualified Expert Witness in the following California counties: Alameda, Colusa, Kern, Fresno, Madera, Merced, Monterey, Orange, Riverside, San Joaquin, San Luis Obispo, Santa Barbara, Santa Cruz, Solano, Sonoma, Sutter, Ventura, Yolo
- United States Tax Court Qualified Expert Witness
- United States Bankruptcy Court Qualified Expert Witness

A list of depositions and trial appearances is available upon request

Awards

- CCOF Presidential Award, California Certified Organic Farmers, February, 2001
- Meritorious Service in Communications, American Society of Farm Managers and Rural Appraisers, November 2004
- H.E. Buck Stalcup Excellence in Education Award, American Society of Farm Managers and Rural Appraisers, October, 2011

Appointments & Activities

- Adjunct Lecturer, University of California, Davis, Department of Agricultural & Resource Economics, current; Courses ARE 140 Farm Management; ARE 145 Appraisal of Farms and Rural Resources, current
- Instructor, "Principles of Farm Management", an Internet course of the American Society of Farm Managers and Rural Appraisers, 1996 to 2007
- President, California Chapter American Society of Farm Managers & Rural Appraisers 1994– 1995; Secretary-Treasurer, 1984 to 1990
- Board of Directors, Yolo Land Trust, 1993-2001

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- Board of Directors, American Red Cross, Yolo County Chapter 1987–1989
- Member, Yolo County Right to Farm Grievance Committee 1992–1995
- Vice Chairman, Management Education Committee, American Society of Farm Managers and Rural Appraisers, 1998–2000 (committee member since 1986)
- Yolo County LAFCo Agricultural Forum LESA subcommittee, 1999
- California Certified Organic Farmers: Treasurer of the Board of Directors, 1998–2003; Executive Director, 1999-2000; Member of the Finance Committee, 1998-current
- CCOF Foundation Going Organic Program, Management Team member 2006-2012
- USDA Organic Grant Panel member, Washington, DC, 2002
- City of Davis Open Space and Habitat Commission, 2006–2016, Chairman, 2007-2009
- Member, Fruit Orchard Technical Advisory Group, Filoli Gardens, Woodside, California
- Member, Organic and Sustainable Agriculture Program Steering Committee, University
 of California Cooperative Extension, Yolo and Solano Counties, California, 2008-2013

Speaking Engagements

- Guest Lecturer, University of Florida at Gainesville, Vegetable Crops Department, seminar on transition to organic agriculture, (November, 1994)
- Featured Program Speaker, 1995 Eco-Farm Conference, Asilomar, California, on economics of organic apple production
- Guest Speaker, Community Alliance with Family Farmers, on farm management and agricultural economics, 1996 and 1997
- Instructor, American Society of Farm Managers and Rural Appraisers, Course M-12, "Standards and Ethics for Professional Farm Managers", March, 1997
- Guest Speaker, American Horticultural Society, "Challenges of Organic Stone Fruit Production", Sacramento, California, July 2001
- Organizer and Presenter, Going Organic Kickoff Meetings, November 2005 and December 2006
- Master of Ceremonies, California Certified Organic Farmers, Annual Meeting, February, 2006, Sacramento, California
- Featured Program Speaker, 2012 Eco-Farm Conference, Asilomar, California, "Imitating Natural Systems: Towards an Indigenous Agro-forestry"
- Seminar presentation: "What Makes for Comparable Sales in Condemnation Appraisal" Rapid Fire Seminar, American Society of Farm Managers and Rural Appraisers, Reno, NV, October 2013.
- Featured Program Speaker, 2014 Eco-Farm Conference, Asilomar, California, "Food Safety Regulatory Compliance in Fruit Orchards."

Publications

- "Principles of Farm Management", Course M-10, a 40-hour professional credit Internet educational offering of the American Society of Farm Managers & Rural Appraisers
- "Conservation Issues in Agriculture", a unit of Course M-25, a 15-hour professional credit Internet educational offering of the American Society of Farm Managers & Rural Appraisers
- "A Primer on Organic Agriculture," an article in 2006 Trends in Agricultural Land and Lease Values, a publication of the California Chapter of the American Society of Farm Managers &

Rural Appraisers

 "Case Study: Using Indigenous Agroforestry Management Techniques to Support Sustainability in Production Agriculture", a paper-poster presented at Harlan II, An International Symposium on Biodiversity in Agriculture: Domestication, Evolution and Sustainability, September 14-18, 2008, University of California, Davis

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Agricultural Consultant Rural Appraiser Consulting Agricultural Economist Farmer

Experience

Agricultural Consultant, Appraiser, Consulting Agricultural Economist.

House Agricultural Consultants, providing agricultural science, economics, management, and appraisal services. 2000–present.

Farmer. Coco Ranch, a family farm growing organic apples, peaches, cherries, and field crops and raising sheep, poultry, and goats. 2000–present.

Software Engineer. Smashwords, Inc. 2011-2020.

Topics of Professional Expertise

- Farm management: good farming practices in orchards and row crops.
- Livestock management: carrying capacity of land, range management, standard
 of care for grazing animals.
- Management evaluation of commercial equestrian facilities.
- Valuation of rural land.
- Valuation of livestock.
- Valuation of freshwater aquaculture facilities (fish farms).
- Agricultural economics.
- Statistical analysis.
- Software engineering.

Qualifications of Henry House, continued

Education

- B.S., "Natural History", University of California, Davis, 1999, with Honors.
 Coursework in agronomy, botany, ecology, entomology, geology, hydrology, nematology, plant pathology, soil biology, sustainable agriculture, statistics, and wildlife biology.
- Numerous courses of the American Society of Farm Managers and Rural Appraisers regarding farm management, agricultural consulting.
- Numerous courses of the Appraisal Institute regarding real-estate appraisal
- Courses from Savory Institute regarding livestock management.

Partial List of Litigation-consulting Assignments

- Consulted for United States Department of Justice, 2015 through present in litigation regarding agricultural land in Tehama County.
- Consulted for EMC Insurance Companies regarding fire-damaged rangeland.
- Consulted for numerous additional law firms and agricultural companies regarding crops, livestock, and auto accidents related to agricultural operations and disputes over customary good farming practices. A list of additional litigation clients served is available upon request.

Partial List of Management-consulting Assignments

- Numerous consulting assignments for Leland Stanford Junior University on the management of its agricultural lands, which feature cattle, horses, and vegetable crops. Topics addressed have included livestock standard of care, carrying capacity of lands, safety of animals, safety of structures, and management of drainage and water quality.
- Consulting farm management for John and Marie Cronin Trust B, a landowner near Rio Vista, California. Lands were utilized for cattle grazing.

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- Numerous appraisal assignments of farmland and rangeland properties utilized for crops and livestock (cattle, sheep, and aquaculture).
- A list of additional management-consulting clients served available on request.

Appointments & Activities

- Member, American Society of Farm Managers and Rural Appraisers.
- Member, California Farm Bureau-Solano County.
- Board of Directors, Davis Media Access, Davis, California, 2014–2017.
- Board of Directors, Davis Farmers Market Association, 2001–2003.
- Assistant instructor, "Principles of Farm Management", course M-10, an Internet course of the American Society of Farm Managers & Rural Appraisers, 1999 to 2003
- Course proctor, "M-25: Enhanced Client Services", an Internet course of the American Society of Farm Managers & Rural Appraisers, 1999 to 2003.

Speaking Engagements

- Assistant lecturer/instructor, "Farm Management", course ARE 140, and "Rural Appraisal", course ARE 145, University of California—Davis, 2015 to present.
- Educational speaker at the annual meeting of the California Chapter of the American Society of Farm Managers and Rural Apraisers, November 19, 2021, Coalinga, California. Topic: valuation of conservation easements.

Publications

 "Principles of Farm Management", Course M-10, a 40-hour professional credit Internet educational offering of the American Society of Farm Managers & Rural Appraisers

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ATTACHMENT B

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Alisha C. Pember From: David Black; Jim Minnick To: Kendra Hartmann Cc:

Comments on the Draft Environmental Impact Report – Brawley Solar Energy Facility (SCH # 2021070424) (CUP No. #20-0030, GPA#21-0003, ZC#21-0003, and WSA) Subject:

Thursday, February 10, 2022 5:09:00 PM Date: Attachments: 5365-005acp - 2,10,22 Ormat Brawley Solar DEIR Comments and Exhibits A-C.pdf

Good afternoon,

Please find attached Comments on the Draft Environmental Impact Report – Brawley Solar Energy Facility (SCH # 2021070424) (CUP No. #20-0030, GPA#21-0003, ZC#21-0003, and WSA) and Exhibits A-C.

We are also providing a Dropbox link containing supporting references: https://www.dropbox.com/sh/d63xor5z5gq9v1k/AAArqX4iEv4b98h2pN5ZybyDa?dl=0.

A hard copy of our Comments and Exhibits A-C will be sent out today via U.S. Mail.

If you have any questions, please contact Kendra Hartmann.

Thank you.

Alisha Pember

Alisha C. Pember Adams Broadwell Joseph & Cardozo 601 Gateway Boulevard, Suite 1000 South San Francisco, CA 94080 (650) 589-1660 voice, Ext. 24 apember@adamsbroadwell.com

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Letter F

Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens")

August 25, 2022

Intro F.1 This is an introductory comment stating that the County failed to respond to the Citizens' comment letter sent on February 10, 2022 on the Draft EIR. The comment notes that the Citizens' comment letter was not included in the previously submitted Final EIR pursuant to CEQA's mandates in CCR Sections 15132(c), 15088(a), (c), and 15132(b)-(d).

The County apologizes for this unintentional oversight, in which an incomplete version of the FEIR file was inadvertently distributed and has since been replaced with the January 2023 Final EIR. The County acknowledges that the Citizens' commment letter was timely submitted during the Draft EIR's public comment period. The completed December 2022 Final EIR recommended for certificiation by County decision-makers includes the Citizens comment letter on the Draft EIR (Final EIR Response to Comment Letter F). Written responses are provided to each comment raised by Citizens' as provided in Comment Letter F. See responses to comments F.2 through F.63 below.

The County has evaluated all the potential impacts of the proposed project in accordance with the provisions of CEQA and recirculation of the EIR is not necessary pursuant to CEQA Guidelines Section 15162.

- **F.2** This is an introductory comment and provides a summary of the proposed project. This comment does not raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required.
- **F.3** This comment provides a summary of the proposed project's components and the discretionary approvals required from the County. This comment does not raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required.
- **F.4** This comment alleges that the Draft EIR fails to meet the requirements of CEQA for the reasons provided below.
 - 1. Failure to provide an adequate Project Description
 - 2. Failure to accurately describe the existing environmental setting
 - 3. Failure to identify, analyze and mitigate potentially significant Project

impacts to air quality, agricultural resources, land use and planning,

public health, biological resources, and from cumulative impacts

4. Failure to propose mitigation measures that are definite, effective, and not impermissibly deferred.

Please refer to more detailed responses to comments F.5 through F.C.10 which provides detailed responses to each of the comments submitted in this comment letter and address each of the areas identified in this comment.

F.5 The County has evaluated all the potential impacts of the proposed project in accordance with the provisions of CEQA and recirculation of the EIR is not necessary as none of the conditions described in CEQA Guidelines Section 15162 have been identified. No substantial changes to the project are proposed and no new information, including new impacts, increase in the

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severity of impacts, or mitigation measures or alternatives have been identified that would reduce or avoid significant impacts, beyond those already proposed and evaluated in the Draft EIR. Therefore, recirculation is not required.

- F.6 The comment letters from SWAPE, Dr. Smallwood, and Mr. House that are attached to the Citizens comment letter (i.e., comment letter F) have been addressed and responded to as separate comment letters. Response to comments F A-1 through F A-18 provide responses to the SWAPE comment letter. Response to comments F B-1 through F B-34 provide responses to Dr. Smallwood's comment letter. Response to comments F C-1 through F C-9 provide responses to Mr. House's comment letter.
- **F.7** This comment introduces the Citizens' statement of interest. This comment does not raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required.
- **F.8** Comment acknowledged. This comment summarizes the purposes of CEQA and does not raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required.
- F.9 Draft EIR Chapter 2 Project Description provides an adequate level of detail for the supporting analysis and conclusions provided in the Draft EIR. The proposed location of the battery energy storage system (BESS) is depicted on Draft EIR Figure 2-3 Site Plan. A description of the battery storage system is provided on Draft EIR page 2-7, which includes, "The proposed project's BESS component would be placed on a 54,000 square-foot concrete pad at the southern edge of the site. The BESS would consisten of 12 banks of batteries totaling up to 432 enclosures. Each bank of batteries would be supported by a DC Combiner, control panel, and inverter/transformer skid. Each of the enclsoures would utilize self-contained liquid cooling systems and include built-in fire supression systems. All batteries would be lithiumion based capable of storging 40 MW (not to exceed 80 MW)."

The BESS (including the batteries) is further described on page 2-7, as follows, "A lithium-ion battery is a type of rechargeable battery that moves from the negative electrode through an electrolyte to the positive electrode during discharge, and back when charging. Lithium-ion batteries use an intercalated lithium compound as the material at the positive electrode and typically graphite at the negative electrode. The batteries have a high energy density, no memory effect and low self-discharge. Lithium-ion batteries would be mounted in racks. These racks would be integrated into containers. Lithium-ion battery racks sit side-by-side and typically have 48 inches of spacing in front of the rack and 18 inches of spacing in the rear of the rack. Spacing may be increased for serviceability. The project design would meet minimum spacing required by code."

The level of detail provided in the Draft EIR regarding the proposed BESS is adequate, as it provides the proposed location, BESS footprint, and battery construction and operational characteristics (including proposed fire protection mechanisms) to evaluate relevant impacts related to the construction and operation of the system.

F.10 The comment states that the Draft EIR does not describe the specific kind of lithium-ion batteries the proposed project will use. CEQA requires a general description of the "main features" of the project and does not require "all of the details or particulars." *Dry Creek Citizens Coalition v. County of Tulare* (1999) 70 Cal.App.4th 20, 26. A project description is adequate if it provides information sufficient to inform the public and the decision-makers of the full scope of the project.

The specific vendor specifications for the equipment used for the project have not yet been selected for the project, which is typical for analyses provided in a Draft EIR, since the project has not yet been approved by the County, it would not be prudent at this stage in the process for the applicant to sign contracts for equipment at risk.

F.11 The comment states that the Draft EIR fails to adequately describe the layout of the batteries or the battery enclosures.

CEQA requires a general description of the "main features" of the project and does not require "all of the details or particulars." *Dry Creek Citizens Coalition v. County of Tulare* (1999) 70 Cal.App.4th 20, 26. A project description is adequate if it provides information sufficient to inform the public and the decision-makers of the full scope of the project. As described on page Section 2.3.2 (page 2-7) of the Draft EIR:

Lithium-ion battery racks sit side-by-side and typically have 48 inches of spacing in front of the rack and 18 inches of spacing in the rear of the rack. Spacing may be increased for serviceability. The project design would meet minimum spacing required by code.

- **F.12** The battery storage capacity for the project would be 40 MW. The County requires that the capacity of a BESS can not exceed twice that of its solar facility. The proposed project's solar facility would generate up 40 MW of solar energy, therefore, the proposed BESS can not exceed 80 MW of storage capacity. However, the project applicant does not intend to store more than 40 MW, which is consistent with what is stated in the Draft EIR.
- F.13 The comment states that the Draft EIR omitted design details that have implications on determining the scope of the project's impacts. CEQA requires a general description of the "main features" of the project and does not require "all of the details or particulars." Dry Creek Citizens Coalition v. County of Tulare (1999) 70 Cal.App.4th 20, 26. A project description is adequate if it provides information sufficient to inform the public and the decision-makers of the full scope of the project. Chapter 2.0, Project Description, of the Draft EIR provides an adequate description of the project and main features of the project, including the BESS. There is sufficient information in Chapter 2.0, Project Description, of the Draft EIR to inform the public and decision-makers concerning the scope of the project and is therefore adequate since it describes the main features of the project.

See response to comment E.29 with regards to mitigating fire risk associated with the BESS.

F.14 This comment states that the Draft EIR lacks key details regarding various other energy-consuming project components, including ancillary equipment such as the cooling and control systems, the inverters, the ventilation and the HVAC units. The specific vendor specifications for the equipment used for the project have not yet been selected for the project, which is typical for analyses provided in a Draft EIR, since the project has not yet been approved by the County, it would not be prudent at this stage in the process for the applicant to be signing contracts for equipment at risk. The CEQA Guidelines acknowledge that exact equipment is often not yet determined when the Draft EIR is prepared and in these cases, reasonable assumptions should be utilized.

Sections 8.1 and 8.2 of the *Air Quality, Energy, and Greenhouse Gas Emissions Impact – Brawley Solar Energy Facility Project* (Appendix C of the EIR) details the assumptions utilized to calculate the onsite electricity use and provides for a very conservative assumption that 2 percent of the

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- energy stored would be consumed through use of air conditioning, control systems, ventilators, inverters, transformers, and power conversion.
- **F.15** This comment states that the Draft EIR fails to describe the electricity needed to operate the BESS. As described in response to comment F.14, the energy use of the BESS was assumed based on conservative values.
- **F.16** Comment acknowledged. This comment describes the requirement of providing the existing environmental setting for the purposes of CEQA and does not raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required.
- F.17 This comment states a Phase I Environmental Site Assessment (ESA) was not prepared. The comment asserts a Phase I ESA is routinely undertaken in the preparation of CEQA documents and is necessary for inclusion in an EIR. While information from a Phase I ESA may be incorporated into an environmental review document if one has been prepared, preparation of a Phase I ESA is not required by CEQA. The Environmental Checklist Form included in Appendix G of the CEQA Guidelines asks if a project would 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? Government Code Section 65962.5 refers to the "Cortese List" database maintained by the California Environmental Protection Agency.

The Draft EIR analyzed hazards and hazardous materials impacts of the proposed project using the thresholds in the CEQA Guidelines, specifically determining if the project is located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. A geographical search for hazardous materials sites, as defined in Government Code Section 65962.5 was conducted based on a review of these databases. The project site is not located on a list of hazard materials sites compiled pursuant to Government Code Section 65962.5. Therefore, implementation of the proposed project would result in no impact related to the project site being located on a listed hazardous materials site pursuant to Government Code Section 65962.5. No further analysis is warranted.

The County has evaluated the potential impacts of the proposed project in accordance with the provisions of CEQA and recirculation of the EIR is not necessary pursuant to CEQA Guidelines Section 15162.

- **F.18** This comment states the Draft EIR did not accuratley characterize the existing environmental setting in regards to biological resources. Please see responses to comment F-20 and F-21. The baseline data included in the Draft EIR is typical of what is expected by wildlife agencies and sufficient to assess the potential for special status species and potential impacts to biological resources, specifically for significant life history events.
- **F.19** This comment states that the biological analysis in the Draft EIR relied on CNDDB to determine occurrence likelihoods of special status species. The comment further states that CNDDB relies on voluntray reporting, not based on scientific sampling. As described in the Project Biological Technical Report (Appendix D to the Draft EIR), the CNDDB is a positive sighting database; therefore, the absence of data is not proof of absence of the species. Because of this known fact, CNDDB was one of multiple factors used to determine the potential for special status species occurrence on the project. Additional factors included a site visit with biologists familiar with the project location and the species known to occur in the area, type and quality of habitat present within and adjacent to the project, and environmental conditions of the site

including soil types (some plants require particular soils) and elevation (plants and some animals only occur at certain elevation ranges).

The comment also states that the survey was performed over a 17.3 hour period. According to the Biological Technical Report, "The survey was conducted on foot throughout the Project site between 0830 and 1715 hours on October 22, 2020." The survey included a total of 9.75 hours. The biological reconnaissance-level survey and technical report were conducted/prepared in accordance with accepted scientific and technical standards that are consistent with the requirements of CEQA, the United States Fish and Wildlife Service (USFWS), and the California Department of Fish and Wildlife (CDFW).

Therefore, the biological analysis is complete and adequate, and recirculation of the Draft EIR is not required.

F.20 This comment mentions that the baseline setting presented in the Draft EIR is incomplete, based on a reported site visit conducted by Dr. Smallwood and his observations or detections of additional wildlife species, including special status species. "Special status species" is a broad term including many status types and not all include legal protection or consideration under CEQA. The biological technical report includes an assessment for species with a status that are required to be considered under CEQA including federally or state listed endangered or threatened species, rare species, fully protected species, plants with a California Rare Plant Rank (only List 1 and 2 species are required, List 3 are recommended, and List 4 are typically included), and wildlife species with a California Species of Special Concern (SSC) status. Dr. Smallwood reported observations of 13 special status species. This list was reviewed by a qualified Chambers Group biologist. Other than tricolored blackbird, which is not confirmed present, none of the 12 species are listed as endangered, threatened, or rare by federal or state governments. Five of the 13 species are SSC species; however, no nesting or wintering habitat is present on the Project site and therefore, these species would only be found flying over or foraging on the Project site. The remaining eight species observed have a status of watch list (WL) or birds of conservation concern (BCC). A status of WL or BCC includes species of conservation concern. These lists have the goal to draw attention to these species and avoid legal listing and as such, WL and BCC species do not require consideration under CEQA.

One daytime survey will not result in detection of all species that may visit a site. Plant species may only be detectable during their specific bloom periods, many mammals are active at night, many reptiles take cover in burrows during the day, and more. A biological reconnaissancelevel survey is meant to gather enough information on existing site conditions to assess the potential for special status species to occur and how they will utilize the site. Wildlife species are mobile (birds being highly mobile) and may use the site to pass through or forage. Therefore, an assessment of special status wildlife species must focus on significant life history events not just presence. For example, significant life history events tracked for avian species by CNDDB include nesting and wintering sites. As was the case for yellow warbler. Potential nesting habitat may be located along New River, located west of the project site. As a result, yellow warbler may be found foraging in surrounding areas. However, nesting habitat for yellow warbler, open-canopy riparian woodland, is not present on the project site; therefore, significant life events would not occur on the project site. Analysis conducted for a species potential to occur is thus based on whether significant life history events would take place at a site in question, based on existing conditions, including the type of habitat present, quality of the habitat, and other environmental conditions/requirements for a species.

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This comment also mentions the use of eBird as data to be utilized for species that may be present in a project area. Data from eBird contains crowdsourced entries from hobby birders and naturalists as opposed to data reported to CNDDB, which is obtained by biological consultants, CDFW and other agency biologists, academics, researchers, and conservation groups such as CNPS and others. While eBird records can be useful as a general overview, it is important for these results to be interpreted by a qualified biologist who is familiar with the conditions on the site in question and who is assessing whether significant life history events would take place at a particular site for a particular species. As such, this comment does not otherwise present new information regarding biological resources that are already disclosed and analyzed in the Draft EIR.

Because special status species may utilize the project site or habitat adjacent to the project site, avoidance and mitigation measures (BIO-1 through BIO-4) were proposed and will be implemented to reduce potential impacts to a less than significant level.

- F.21 This comment states that the Draft EIR must be revised and recirculated to provide complete and accurate baseline data to determine project impacts; however, the baseline data included in the Draft EIR is typical of what is expected by wildlife agencies and sufficient to assess the potential for special status species and potential impacts to biological resources, specifically for significant life history events. Species may be found present on the project during construction while moving/foraging; however, biological avoidance and minimization measures (BIO-1 through BIO-4) presented in the Draft EIR account for these potential occurences and with implementation, any potential impacts would be considered less than significant.
- **F.22** Comment acknowledged. This comment summarizes the purposes of CEQA and does not raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required.
- **F.23** Issues summarized in this comment are addressed in detail within this responses to comments, including subsquent response F.24 through F.60.
- **F.24** The commenter claims that the silt content value with respect to estimating dust emissions was changed to 3% in order to account for Rule 805.F.1.c without supporting evidence and that Rule 805.F.1.c only applies to unpaved roads, however, the change to CalEEMod affected all off-road construction activities. The commenter's claims are a summary of the claims made on pages 3 and 4 of the SWAPE letter.

As detailed on page 3 of the SWAPE letter, the material silt content value change to 3% is only for on road dust, so the commenter's claim that this change to the CalEEMod model would affect the material to be bulldozed is not correct, as this change had no affect to fugitive dust emissions created from bulldozer operations within CalEEMod. As for the change in silt content value to 3%, this was made in consultation with Curtis Blondell at ICAPCD in November 2021 and in consideration of Project Design Features 1 – 7 from the Air Report, where the project applicant has agreed to these conditions, which go above and beyond the ICAPCD requirements for controlling fugitive dust. Specifically, the 3% amount was chosen since it was determined to be a reasonable amount less than 5% in order to meet the requirements of Rule 805.F.1.c, that details the silt content must be less than 5% (equal to 5% would violate Rule 805.F.1.c). This is detailed on pages 39 and 40 of the Air Quality, Energy, and Greenhouse Gas Emissions Impact Analysis Report. Therefore, the Draft EIR did not assume an artificially lower silt content with respect to the estimation of dust emissions.

F.25 The commenter claims that the change of the percentage of trips taken on paved roads from 50% to 85% and 99% is not substantiated by evidence.

As detailed on pages 39 and 40 of the Air Quality, Energy, and Greenhouse Gas Emissions Impact Analysis Report, the change of percent of trips on paved roads was changed to 85% in order to account for Best Avenue that is adjacent to the project site being paved. It should be noted that Best Avenue connects with Highway 111, that is located approximately one mile south of the project site, which will be the primary route to the project site. As such, only increasing to 85% pavement provides for a conservative analysis, since a more realistic percentage of trips on paved roads would be 99 percent. For reference, the default values in CalEEMod for paved roads in the South Coast Air Basin is 100% pavement. Through consultation with Curtis Blondell at the ICAPCD in November 2021, the ICAPCD acknowledges that the 50% pavement default value in CalEEMod is overly conservative for projects that are located in close proximity to paved roads. In order to provide a conservative analysis of the potential additional emissions created from changing the CalEEMod model from 99% pavement to 85% percent pavement (a 14 percent change), the PM₁₀ and PM_{2.5} mobile source emissions shown in Table L were multiplied by 14, and the results are shown in the revised Table L, below. As shown in the revised Table L, the change in percent paved roads would increase PM₁₀ and PM_{2.5} emissions, however the resultant emissions would still be well below the ICAPCD significance thresholds, which would not result in a change of significance and no recirculation of the Draft EIR is required.

Table B – Operational Criteria Pollutant Emissions

	Pollutant Emissions (pounds/day)						
Activity	ROG	NOx	CO	SO ₂	PM10	PM2.5	
Area Sources ¹	5.35	0.00	0.04	0.00	0.00	0.00	
Energy Usage ²	0.00	0.00	0.00	0.00	0.00	0.00	
	0.17	0.18	1.31	0.00	2.35 <u>32.9</u>	0.27 <u>3.78</u>	
Mobile Sources ³					<u>1</u>		
Backup Generator ⁴	0.05	0.17	0.18	0.00	0.01	0.01	
	5.57	0.35	1.53	0.00	2.35 <u>32.9</u>	0.28 3.78	
Total Emissions					<u>2</u>		
ICAPCD Operational							
Thresholds	137	137	550	150	150	550	
Exceeds Threshold?	No	No	No	No	No	No	

Notes:

Source: Calculated from CalEEMod Version 2020.4.0.

- **F.26** This comment describes the requirement to analyze a project's energy impacts pursuant to CEQA. This comment does not raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required.
- **F.27** As described in Draft EIR Section 6.2 Energy, the energy analysis is derived from the Air Quality, Energy, and Greenhouse Gas Emissions Analysis provided in Draft EIR Appendix C. The operational electricity usage was calculated in the CalEEMod model run that is detailed

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¹ Area sources consist of emissions from consumer products, architectural coatings, and landscaping equipment.

² Energy usage consist of emissions from natural gas usage (no natural gas usage during operation of the project).

³ Mobile sources consist of emissions from vehicles and road dust.

⁴ Backup Generator based on a 20 kW (62 Horsepower) diesel generator that has a cycling schedule of 30 minutes per week.

in Section 8.1 of the technical report, and that determined the proposed PV solar panels will generate 97,333,333 kWh per year of electricity and operation of the project will use 1,946,667 kWh per year of electricity, which would result in a net generation of 95,386,667 kWh per year of electricity. Regardless of whether discreet components were analyzed, the energy demands of the project were conservatively estimated and are well below any net increase in energy demand as a result of the project. Rather, the project will provide a surplus specifically of electrical energy (i.e., renewable electrical energy) that will contribute to an overall decrease of greenhouse gas emissions, and a net benefit related to GHG. As stated in the technical report, if analysis of the project's energy use reveals that the project may result in significant environmental effects due to wasteful, inefficient, or unnecessary use of energy, or wasteful use of energy resources, the EIR shall mitigate that energy use. The proposed project will not result in wasteful, inefficient or unnecessary use of energy or wasteful energy resources, and will in fact provide a net energy benefit. Therefore, no impact to energy will result with implementation of the proposed project.

- F.28 The commenter claims that the BESS, if charged at night with energy from the grid rather than during the day from the solar facility, actually promotes the use of non-renewable energy and GHG emissions. The commenter's claim is speculative and not a likely or reasonable assumption of how the BESS system would operate. The sole reason for locating the BESS on the project site is to capture and hold the excess power from the solar panels that is derived during daylight hours (and not from a non-renewable energy source), and then provide the ability to release the power when it is needed. Furthermore, the transmission lines for the proposed project would be connected to the substation for the existing North Brawley Geothermal Plant, which also produces 100% renewable energy. As such, the commenter's statement is speculative. Even if it was assumed that anything more than a very negligible amount of power would ever be transmitted to the BESS for storage would be anything but renewable energy. It is also speculative to assume that in the very unlikely situation (as there is no direct non-renewable electicity connection to the BESS) energy utilized by the BESS with nonrenewable energy would be at an amount to change the levels of significance identified in the Draft EIR. The BESS is proposed in support of the solar energy project, a renewable energy source.
- **F.29** The commenter claims that the Draft EIR fails to disclose the energy impacts of the project (see response to comment F.14) and that it fails to include conditions restrict battery charing to use of renewable energy (see response to comment F.28). As stated in the Draft EIR, the proposed project would not result in a significant energy impact. Therefore, no energy mitigation measures are required.
- **F.30** This comment describes the requirement to describe, calcuate or estimate the amount of greenhouse gases resulting from a project pursuant to CEQA. This comment does not raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required.
- **F.31** The commenter claims that the BESS may be charged with energy from the grid that does not contain 100% renewable energy mix, which would result in an increase in GHG emissions. The transmission lines for the proposed project would be connected to the substation for the existing North Brawley Geothermal Plant, which also produces 100% renewable energy. As such, the commenter's statement is not correct. Additionally, it is speculative to to claim that anything but a very negligible amount of power that would ever make it to the BESS would be anything but renewable energy. Even if this speculative comment were correct, the amount of

- energy utilized by the BESS with nonrenewable energy would be minimal it would not change any of the levels of significance provided in the Draft EIR. However, the BESS will be utilized for the storage of renewable energy.
- **F.32** The Draft EIR discloses the potential health risks associated with the project (see Draft EIR pages 3.4-2 and 3.4-3); and provides an analysis of the health risk associated with the project (see Draft EIR pages 3.4-21 and 3.4-22).
- F.33 The commenter claims that OEHHA Guidance Manual requires projects where construction exceeds 2 months be evaluated for cancer risks. First, the *Air Quality, Energy, and Greenhouse Gas Emissions Impact Brawley Solar Energy Facility Project* (Appendix C of the EIR) provided a qualitative analysis of the construction-related cancer impacts created from TAC emissions. Second, the proposed project does not require an air permit from the State to operate, which strict adherence to the OEHHA Guidance Manual is required. Although the OEHHA Guidance Manual can be used as a public reference manual for any project, this project is not required to meet all conditions of this or any Guidance Manual that was not prepared by the lead agency. Finally, the commenter did not provide any proof that the qualitative analysis of construction-related TAC emissions provided in the *Air Quality, Energy, and Greenhouse Gas Emissions Impact Brawley Solar Energy Facility Project* (Appendix C of the EIR) did not adequately assess the potential impacts from diesel-related construction emissions. As such, no changes are needed to the analysis.
- **F.34** This comment describes the importance of the preservation of agricultural resources to California and Imperial County. This comment does not raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required.
- **F.35** This comment accurately describes the Important Farmland and acreage occuring on the project site. This comment does not raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required.
- **F.36** See response to comment D.9 and E.9.
- F.37 The commenter claims the Draft EIR fails to evaluate the site's existing setting with regards to current agricultural and soil conditions. The Draft EIR includes a description of the existing environmental setting with regards to current agricultural and soil conditions. As described on page 2-1 of the Draft EIR, the project site contains alfalfa fields within different levels of harvest. North and east of the project site is undeveloped agricultural land. With regards to soil conditions, page 3.7-1 of the Draft EIR describes the local geology and surface conditions of the project site.

The commenter asserts that the Draft EIR offers no analysis of the long-term soil impact of the project. The Draft EIR analyzes the proposed project's potential impacts on the physical and chemical makeup of the soil materials within the upper soil horizon (see Impact 3.3-3 in Section 3.3, Agircultural Resources of the Draft EIR). The project's potential impacts identified in the Draft EIR include increased decomposition of soil organic materials, increased leaching of plant available nitrogen, and depletion of soil biota communities. As described on page 3.3-13 of the Draft EIR, any reductions in agricultural productivity could significantly limit the types of crops that may be grown within the project site in the future. Mitigation Measure AG-1b will ensure that the project applicant adheres to the terms of the agricultural reclamation plan prepared for the project site. The Reclamation Plan will document the procedures by which the project site will be returned to its current agricultural condition, including soil conditions. With implementation of Mitigation Measure AG-1b, the proposed project's potential impacts on

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- the on the physical and chemical makeup of the soil materials within the upper soil horizon would be reduced to a level less than significant.
- **F.38** This comment describes mitigation measures pursuant to CEQA. This comment does not raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required.
- **F.39** This comment summarizes Mitigation Measures AG-1a and AG-1b of the Draft EIR and asserts that they are legally inadequate or insufficient, or both. These measures have been developed and approved by the Board of Supervisors as adequate mitigation to address the temporary conversion of agricultural lands for solar energy use within the County.
- **F.40** See response to comment D.9 and D.5.
- F.41 Approval by the County Agricultural Commissioner of the project decommissioning plan is required as a condition of approval of the Conditional Use Permit for the project. Agricultural conditions of the site are documented in Draft EIR Section 3.3, Agricultural Resources. Figure 3.3-1 Important Farmlands depicts the Important Farmland categories on the project site and mitigation measures are proposed consistent with County policy for mitigation of agricultural impacts based on the mapped Important Farmlands for the site. Components of the decommissioning plan require documentation of site conditions prior to development of the project, so that the site would be restored to its existing, pre-project condition.
- **F.42** Please refer to response to comment E.7 with regards to enforceability of mitigation measures.
- F.43 This comment claims the project is inconsistent with several of policies and objectives in the County's General Plan and SCAG's 2020-2045 RTP/SCS, resulting in significant and unmitigated project impacts. The County standsby the conclusions in the DEIR that the project would be consistent with the County's General Plan and SCAG's 2020-2045 RTP/SCS. Refer to responses to comments F.44 through F.48 describing the project's consistency with the County's General Plan and SCAG's 2020-2045 RTP/SCS.
- F.44 The comment acknowledges that the project is in alignment with the the SCAG's 2020-2045 RTP/SCS goal to "reduce GHG emissions and improve air quality." However, this comment claims that the project is inconsistent with the County's General Plan and SCAG's 2020-2045 RTP/SCS due to the conversion of farmland. This project-related impact is disclosed in Impact 3.3.1 of the DEIR which states that. "..., the project would result in the temporary conversion of approximately 227 acres of land currently under or available for agricultural production to non-agricultural uses." This impact was determined to be significant prior to implementation of proposed mitigation measures. With the implementation of Mitigation Measures AG-1a and AG-1b, this impact would be reduced to a less than significant level. Mitigation Measure AG-1a addresses the temporary conversion of agricultural lands by providing the applicant an option to provide agricultural conservation easement(s), payment of an agricultural in-lieu mitigation fee which would be placed in a trust account administered by the Imperial County Agricultural Commissioner's office and used for such purposes as "acquisition, stewardship, preservation and enhancement of agricultural lands" or public benefit agreement, which requires an Agricultural Benefit Fee payment that would be used for "addressing the mitigation of agricultural job loss on the local economy, or emphasis on creation of jobs in the agricultural sector of the local economy for the purpose of off-setting jobs displaced by the project. Mitigation Measure AG-1b addresses the restoration of the agricultural lands. These measures have been developed and approved by the Board of Supervisors as adequate mitigation to address the temporary conversion of agricultural lands for solar energy use within the County.

- Please refer to response to comment E.7 with regards to enforceability of mitigation measures.
- **F.45** This comment summarizes the project's consistentcy with the "Island Overlay" criteria as described in the Draft EIR. No further response is required.
- **F.46** Please refer to responses to comments F.47 and F.48.
- F.47 This comment claims that the project does not result in an expansion of an existing renewable energy operation because it does not expand the existing North Brawley Geothermal Power Plant substation. While the project would not result in the direct expansion of the North Brawley Geothermal Power Plant substation footprint, the gen-tie line for the proposed project would be connected to the substation for the existing North Brawley Geothermal Plant, which also produces 100% renewable energy. The interconnection to the North Brawley Geothermal Power Plant substation would expand renewable energy generation by adding an additional 40 MW of solar energy produced by the project.
- **F.48** The County has evaluated all the potential impacts of the proposed project in accordance with the provisions of CEQA. As discussed in the Draft EIR, all of the potentially significant impacts of the proposed project would be reduced to a level less than significant with implementation of mitigation measures. No significant and unmitigated impacts would occur with implementation of the proposed project.

As discussed in response to comment D.2, the project site is located adjacent to an existing RE Overlay Zone; and the project meets the criteria for an amendment to the overlay zone.

The County has evaluated all the potential impacts of the proposed project in accordance with the provisions of CEQA and recirculation of the EIR is not necessary pursuant to CEQA Guidelines Section 15162.

- **F.49** See response to comment E.47.
- F.50 This comment states that the Draft EIR did not adequately analyze project impacts to biological resources. As required by CEQA, the Draft EIR describes the existing environmental conditions and surrounding uses, establishing the baseline for measuring environmental impacts that may result from the project. As required by CEQA, data collected included a review of biological databases (those included in the Draft EIR and typically requested by CDFW and USFWS include CNDDB, CNPSEI, IPaC, and NWI) and on-site data gathering. The project's on site data was supported by recent aerial photographs and digital photographs. The baseline data was typical and sufficient for assessing whether or not special status species would utilize the site for significant life history events. Focused surveys are recommended when a listed species has a moderate to high potential to occur within the project area for those significant life history events, which was not the case for the project site. However, mobile species, especially birds, may be found utilizing a project site while foraging or are common species that have become acclimated to human activities. The biological avoidance and minimization measures (BIO-1 through BIO-4) presented in the Draft EIR account for these types occurences and with implementation, any potential impacts would be considered less than significant.
- **F.51** This comment states that the Draft EIR's analysis of project impacts on a wildlife corridor is inaccurate and partial. Fragmentation of wildlife habitat affects ecological processes. To reduce some of those affects, larger patches of natural habitat (conservation areas) are connected with linear patches of natural habitat (wildlife corridors). Wildlife corridors allow for movement and dispersal of plants and animals, maintaing biodiversity. The project site is

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located within the boundaries of the Desert Renewable Energy Conservation Plan (DRECP), but is not within or adjacent to DRECP conservation areas or wildlife corridors. The major goal of the DRECP is to develop a comprehensive conservation strategy for plant and wildlife species. The DRECP includes 5 million acres of pre-existing conservation areas, 4.2 million acres of new conservation areas, and wildlife corridors and linkages for the protection of 50 special status species and 37 unique habitats. While daily movement for some special status species that occur in the project vicinity may occur on the project site, particularly for mobile species such as birds that may easily fly from one patch of habitat to another, the site is largely composed of agricultural land and bare ground from previous agricultural uses. Because the site is mostly disturbed by human activities and therefore is largely in a non-natural state, the site is not considered habitat for special status species and therefore not considered valuable as a conservation area or a wildlife corridor. Therefore, as discussed in the Draft EIR, development of the project would not substantially interfere 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.

F.52 This comment states that development of the site would result in the loss of habitat for wildlife. Of the approximately 272 acres included in the biological reconnaissance survey, approximately 252 acres include agricultural, bare ground, and other developed or non-native land types, and are not considered suitable habitat for special status species. The remaining vegetated areas, approximately 20 acres, include mostly native habitat types. Of those 20 acres, approximatley 11 acres occur within jurisdictional waters which will be avoided. The remaining 9 acres include shrub habitat along the railroad and according to the site plan map, are outside of the project impact areas. Therefore, the project will not have a significant impact to special status species based on habitat loss.

The comment also states that a large number of nesting sites would be lost as as result of the project. Ground nesting bird species may utilize the 252 acres of low plant cover and a larger number of bird species are expected to utilize the remaining 20 acres, to a higher degree. Birds protected under the Migratory Bird Treaty Act must be considered under CEQA. There is a potential for nesting birds to be impacted by the project, therefore, the Draft EIR includes avoidance and minimization measures (BIO-1 through BIO-4), to reduce these potential impacts to a less than significant level.

F.53 This comment describes the concern that collision mortality rates may be high for bird and bat species. The project site is located near the center of a very large agricultural area of Brawley. With human disturbance, a majority of the species in the area are common species that have adapted to the presence of humans. The avoidance and minimization measure BIO-1, will require that all electrical components on the project site be underground or protected so there will be no exposure to wildlife and therefore no potential for electricution. Also, based on the Avian Powerline interation Committees's (APLIC) 1996 report on power line elctricution in the U.S., avian electricution risk is highest along distribution lines (generally les than 69 kV) where the distance between energized phases, ground wires, transformers, and other components of an electrical distribution system are less than the length or skin-to-skin contact distance of birds. The distance between energized components along transmission lines (less than 69 kV) is generally insufficient to present avain electricution, and is the case for thie project.

In addition, the DRECP takes into account potential impacts to species where renewable energy developments are approved. The DRECP was developed by local agencies including the Bureau of Land Management, the U.S. Fish and Wildlife Service (USFWS), the California

Energy Commission (CEC), and the California Department of Fish and Wildlife (CDFW). The DRECP allows for the development of 388,000 acres of renewable energy while providing protection and conservation of desert ecosystems (4.2 million acres in addition to the 5 million existing acres). The DRECP plans at a landscape level in order to identify where future renewable energy projects are best suited. Sites identified for development by the agencies, were based on their energy generating potential and low resource conflicts. Conservation areas and wildlife corridors are closed to renewable energy development in addition to limitations on overall ground disturbance. As such, while impacts may occur, these impacts are considered less than significant with incoprporation the DRECP.

- **F.54** This comment states that while Dr. Smallwood agrees with the avoidance and minimization measures included in the Draft EIR (BIO-1 through BIO-4), they may not be enough to reduce potential impacts to a less than significant level. As stated in the Draft EIR, the measures are implemented to avoid or minimize potential impacts. The goal of mitigation measures is to always avoid first, but when avoidance isn't possible, that impacts are minimized to the furthest extent feasible. However, as discussed in the Draft EIR, implementation of the measures (BIO-1 through BIO-4), would reduce all potential impacts to a less than signiciant level.
- F.55 This comment states that effective project mitigation would include Compensatory Mitigation for preservation of open space near the project site and a wildlife rehabilitation center for wildlife that may be impacted by project infrastructure. Mitigation is already in place with the implementation of the DRECP. One of the main goals of the DRECP is to provide larger patches of open space for conservation and to connect those patches with wildlife corridors, compensating for the loss of wildlife movement areas and smaller patches that have no connectivity other than for highly mobile species such as birds and bats that may fly from patch to patch. Thus, the direct, indirect, and cumulative impacts of the project were properly analyzed and mitigated to a level below significance in accordance with CEQA within the Draft EIR. No additional significant impacts have been identified and no additional mitigation is required for the project beyond what is already provided.
- **F.56** This comment describes the requirement to analyze cumulative impacts of a project pursuant to CEQA. This comment does not raise a specific issue related to the adequacy of the Draft EIR; therefore, no further response is required.
- F.57 This comment suggests there are "residual impacts" of other projects that when, combined, would result in cumulatively significant impacts. The cumulative impacts analysis provided in Draft EIR Chapter 5 addresses potential cumulative impacts based on a number of criteria, including timing of construction and operation of cumulative projects as it relates to anticipated construction and operational timing of the proposed project (e.g., do cumulative projects overlap, in particular with respect to construction such that short-term impacts would be cumulatively significant), geographic disposition in relation to the project, and whether these factors are germaine to the analysis of specific resources. Where impacts have been identified associated with other cumulative projects, mitigation measures have been required to reduce the impact to a less than significant level. Therefore, there are no residential impacts and it is not logical to conclude that where impacts have been mitigated to less than significant, the combined effect of the residual impacts therefore must be accounted for, resulting in a cumulative impact.
- **F.58** This comment suggests that the conclusion regarding cumulative impacts for any resource area is based on a comparison of the project's percentage of incremental contribution as

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- compared to the whole (e.g., order of magnitude). That is incorrect. Please refer to EIR Chapter 5 Cumulative Impacts.
- **F.59** Please refer to response to comment D.10 with regards to the project's cumulative effects on agricultural resources.
- **F.60** The County has evaluated all the potential cumulative impacts of the proposed project in accordance with the provisions of CEQA and recirculation of the EIR is not necessary pursuant to CEQA Guidelines Section 15162.
- **F.61** Please refer to preceding responses to comments F.1 through F.60 and responses to attachments F A, F B and F C. Based on the information provided in the Draft EIR, and as responded to in these responses to comments as part of this Final EIR, the project has been adequately described in the Draft EIR, existing environmental setting has been adequately characterized, and potential impacts to agricultural resources, air quality, special-status species and public health are adequately and corresponding mitigation are adequately assessed and prescribed, respectively.
- **F.62** The County has evaluated all the potential impacts of the proposed project in accordance with the provisions of CEQA and recirculation of the EIR is not necessary pursuant to CEQA Guidelines Section 15162.

Letter F - Exhibit A

Letter to Kendra Hartmann, Adams Broadwell Joseph & Cardozo from Matt Hagemann and Paul Rosenfeld, SWAPE, Subject: Comments on the Brawley Solar Energy Facility Project (February 10, 2022)

- **F A-1** This comment summarizes SWAPE's understanding of the project description and no comments are made related to the Draft EIR; therefore, no response is needed here.
- **F A-2** Refer to responses to comments F A-3 through F A-18.
- **F A-3** See reponse to comment F.17.
- **F A-4** The commenter notes that all changes to CalEEMod default values should be justified with substantial evidence. Comment noted.
- **F A-5** The commenter claims that the silt content values utilized in CalEEMod were unsupported. The justification for the use of the silt content values have been previously explained in response to comment F.24.
- **F A-6** The commenter claims that the percent paved road values utilized in CalEEMod were unsupported. The justification for the use of percent paved road values have been previously explained in response to comment F.25.
- F A-7 The commenter claims that the indoor water use rate utilized in CalEEMod was unsupported. The commenter is correct that the water usage rate for the project changed between preparation of the Air Report that analyzed 0.81-acre feet per year and release of the Draft EIR, where the Project Description showed the project would utilize 3.1-acre feet per year, which is 3.8 times more water than what was analyzed in CalEEMod. It should be noted that CalEEMod only utilizes water consumption rates to calculate GHG emissions and does not utilize water rates to calculate criteria pollutant emissions.

As detailed in Table N – Project Related Greenhouse Gas Annual Emissions from the Air Report, the water and wastewater emissions were calculated at 0.66 MTCO2e per year, based on the new water usage rate, this would increase this emission rate to 2.53 MTCO2e per year and total operational GHG emissions of -4,316.99 (originally -4,319.52) MTCO2e per year. The operational GHG emissions are still well below the 900 MTCO2e per year threshold and this change would not result in any change in significance identified in the Air Report. The commenter's claim that this additional water should have been analyzed as indoor water, instead of outdoor water is incorrect, since almost all of this water will be utilized in PV module washing and would not end up in the septic system or sewer system.

- **F A-8** The commenter notes how the construction and operations related TAC emissions from the project were analyzed qualitatively in the Air Report. Comment noted.
- F A-9 The commenter claims that a quantified construction and operational HRA should have been prepared. The commenter claims that since the project would generate 160 truck trips per year, which is equivalent to 0.4 truck trips per day and a backup generator located as near as 1,900 feet from the nearest sensitive receptor would potentially create a significant cancer risk impact from TAC emissions, without providing any calculations or referencing any public documents that show that these nominal levels of activities would create a significant cancer risk impact. For reference, the *Air Quality and Land Use Handbook*, prepared by CARB, April 2005, details that it requires a project to generate 100

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trucks per day before there is potentially a significant cancer risk impact to the nearby sensitive receptors. Since the project would generate 0.4 percent of the truck trips that would potentially create a significant cancer risk impact, the commenter claims that the project should have prepared a quantitative HRA is incorrect as there is no reason to believe that this project has the potential to create a significant cancer risk impact from diesel emissions.

- F A-10 The commenter claims that OEHHA Guidance Manual requires project's where construction exceeds 2 months be evaluated for cancer risks. First, the Air Report provided a qualitative analysis of the construction-related cancer impacts created from TAC emission, that the commenter showed in Comment F A-8 above. Second, this project does not require an air permit from the State to operate, which strict adherence to the the OEHHA Guidance Manual is required. Although the OEHHA Guidance Manual can be used as a public reference manual for any project, this project is not required to meet all conditions of this or any Guidance Manual that was not prepared by the lead agency. Finally, the commenter did not provide any proof that the qualitative analysis of construction-related TAC emissions provided in the Air Report did not adequately assess the potential impacts from diesel-related construction emissions. As such, no changes are needed to the analysis.
- F A-11 The commenter claims that the Draft EIR is inconsistent with the ICAPCD guidance that the states that projects that emit TAC emissions may have the potential to create a significant cancer risk from TAC emissions and that ICAPCD should be consulted on any project with the potential to emit toxic or hazardous pollutants. First, it should be noted that we have been consulting with the ICAPCD throughout the entire process of preparing the Air Report and DEIR and the ICAPCD reviewed the Air Report and did not have any issues with the construction or operation-related qualitative TAC emissions analyses. As such, the TAC emissions analysis provided in the Air Report and DEIR is adequate and no changes are needed to the TAC emissions analysis.
- **F A-12** The commenter states that the project would generate net annual GHG emissions of -4,319.54 MTCO₂e, which would not exceed the 900 MTCO₂e threshold. Comment noted.
- The commenter claims that the GHG analysis fails to disclose the project's operational F A-13 energy calculations, since specific BESS systems were not provided in the Draft EIR. As detailed in the Project Description, the specific BESS systems have not yet been selected for the project, which is typical for analyses provided in a Draft EIR, since the project has not yet been approved by the County, it would not be prudent this early in the process for the applicant to be signing contracts for equipment yet. The CEQA Guidelines acknowledge that exact equipment is often not yet determined when the Draft EIR is prepared and in these cases, reasonable assumptions should be utilized. Sections 8.1 and 8.2 of the Air Report details the assumptions utilized to calculate the onsite electricity use and provides for a very conservative assumption that 2 percent of the energy stored would be consumed for through use of air conditioning, control systems, ventilators, inverters, transformers, and power conversion. The commenter did not provide any supporting information that details that the 2 percent factor is not a reasonable factor to utilize. As such, no changes have been made to the energy calculations provided in the Air Report and DEIR.

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- F A-14 The commenter states that the Draft EIR fails to provide information or suppporting evidence regarding the amount of electricity to operate the BESS. The commenter is not correct, as detailed above in response to comment F A-13, the energy use of the BESS was assumed based on conservative values and the commenter has not provided any information to refute the validity of the values utilized.
- **F A-15** The commenter states that the Draft EIR fails to evaluate indirect GHG emissions associated with the BESS. See responses to comments F.28 and F.31.
- **F A-16** See response to comment F.31.
- **F A-17** See response to comment F.28.
- **F A-18** Comment acknwledged, no further response is necessary.

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Letter F - Exhibit B

Letter to Kendra Hartmann, Adams Broadwell Joseph & Cardozo from Shawn Smallwood re:Comments on the Brawley Solar Project (February 10, 2022)

- **F B-1** This comment summarizes Dr. Smallwood's understanding of the project description and no comments are made to the Draft EIR; therefore, no response is needed here.
- **F B-2** This comment summarizes Dr. Smallwood's qualifications and no comments are made to the Draft EIR; therefore, no response is needed here.
- F B-3 This comment describes the general conditions of the site as described by Dr. Smallwood following his reported visit to the site in February 2022. This section also discusses a "Habitat Restoration" sign posted west of the site, not mentioned in the Draft EIR. Chambers Group did document and is aware that a restoration site is located near the project. As described in the Draft EIR, no direct impacts will occur to areas located outside of the project site. In addition, indirect biological impacts to adjacent/nearby habitat were analyzed in the Draft EIR including noise levels, introduction of invasive and nonnative species, increase in human activity, and increase in dust. As discussed in the Draft EIR, implementation of biological avoidance and minimization measures (BIO-1 through BIO-4) would reduce potential impacts to a less than significant level.
- **F B-4** This comment describes the wildlife species Dr. Smallwood reports observing during his reported visit to the site. No comment was made in this section; however, please see response F-20 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter, which details the purpose of the biological assessment conducted for the project. Special status species may utilize the project site or habitat adjacent to the project site; therefore, avoidance and minimization measures (BIO-1 through BIO-4) were proposed and will be implemented to reduce potential impacts to a less than significant level.
- F B-5 This comment states the Draft EIR did not accuratley characterize the existing environmental setting. Please see response F-20 and F-21 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter. The baseline data inluded in the DEIR is typical of what is expected by wildlife agencies and sufficient to assess potentials for special status species and potential impacts to biological resources, specifically for significant life history events. Special status species may utilize (e.g., move through, fly over, forage, and/or nest) the project site or habitat adjacent to the project site; therefore, avoidance and minimization measures (BIO-1 through BIO-4) were proposed and will be implemented to reduce potential impacts to a less than significant level.
- F B-6 This comment discusses the fact that one survey will not result in the detection of all species that may occur in the area and/or visit the site in question. Please see response F-20 and F-21 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter. The baseline data inluded in the Draft EIR is typical of what is expected by wildlife agencies and sufficient to assess potentials for special status species and potential impacts to biological resources, specifically for significant life history events. Special status species may utilize the project site or habitat adjacent to the project site; therefore, avoidance and minimization measures (BIO-1 through BIO-4) were proposed and are required to be implemented to reduce potential impacts to a less than significant level.
- **F B-7** This comment states that additional surveys would result in more wildlife species observations and includes data from research of a site near Sacramento, California. We agree that more

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surveys could result in additional species observations. It should also be noted that different survey locations, even throughout California, may include a variety of habitat types that will in turn influence the types and number of species that occur there. Therefore, it is unlcear if the data included in the research for the City of Sacramento would apply to this project site. Regardless of the data presented, as noted in detail in response F-20, F-21, and F-52 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter, the baseline data inluded in the Draft EIR is typical of what is expected by wildlife agencies and sufficient to assess potentials for special status species and potential impacts to biological resources, specifically for significant life history events. A majority of the habitat on site is non-native and of low value to most special status wildlife species due to disturbance. In addition, native vegetation present along jurisdictional features and within the railroad right-of-way will be avoided. However, special status species may utilize the project site or habitat adjacent to the project site; therefore, avoidance and minimization measures (BIO-1 through BIO-4) were proposed and are required to be implemented to reduce potential impacts to a less than significant level.

- F B-8 This comment discusses the fact that additional surveys would result in more wildlife species observations. Dr. Smallwood also states that he thinks he detected a listed species (tricolored blackbird). The observation is uncertain because he was unable to be certain this species was within the flock of birds he observed. As described in response F-20 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter, Dr. Smallwood reported observations of 13 special status species. This list was reviewed by a qualified Chambers Group biologist. Other than tricolored blackbird, which is not confirmed present, none of the remaining 12 species are listed as endangered, threatened, or rare by federal or state governements. Five of the 13 species are SSC species; however, no nesting or wintering habitat is present on the project site and therefore, these species would only be found flying over or foraging on the project site. However, special status species may utilize the project site or habitat adjacent to the project site; therefore, avoidance and minimization measures (BIO-1 through BIO-4) were proposed and are required to be implemented to reduce potential impacts to a less than significant level.
- F B-9 This comment notes that the assessments made for the potential for special status species occurences were insufficient. Many types of human disturbance causes a reduction in species diversity, particularly those species that are not tolerant of human presence. On the other hand, common species will utilize a wider variety of habitat types and do tolerate human presence. A biological reconnaisance survey identifies habitats present on the project site, compares those habitat types with those required for special status species that may occur in the project area, and then determines the potential for those species to occur, as was done for this project. Please see responses F-19 and F-20 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter for additional details on the biological assessment process.
- **F B-10** This comment continues from the previous comment, stating that special status species were observed on the project by Dr. Smallwood, that were previously identified as absent (specifically a bird). Although some of the special status bird species were determined to be absent from the site because nesting habitat was not present on site for that particular species, some of those birds may utilize the project site or habitat adjacent to the project site for other purposes; therefore, avoidance and minimization measures (BIO-1 through BIO-4) were proposed and are required to be implemented to reduce potential impacts to a less than

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- significant level. Please see responses F-19 and F-20 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter for additional details on the biological assessment process.
- **F B-11** This comment continues from the previous comments, stating that special status species known to occur near the site, may also occur on the project, with the focus on birds. Special status species, many of which may only fly over the site, may utilize the project site or habitat adjacent to the project site; therefore, avoidance and minimization measures (BIO-1 through BIO-4) were proposed and will be implemented to reduce potential impacts to a less than significant level. Please see responses F-19 and F-20 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter for additional details on the biological assessment process.
- **F B-12** This comment notes that additional data was not collected from sources such as eBird. As is typical for biological reconnaisance-level surveys, biologists used data reported to CNDDB (obtained by biological consultants, CDFW and other agency biologists, academics, researchers, and conservation groups such as CNPS and others) along with their experience conducting multiple surveys in the project area, to analyze species potentials. Special status species may utilize the project site or habitat adjacent to the project site; therefore, avoidance and minimization measures (BIO-1 through BIO-4) were proposed and will be implemented to reduce potential impacts to a less than significant level. Please see responses F-19 and F-20 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter for additional details on the biological assessment process.
- **F B-13** This comments continues from the comment above stating that CNDDB was relied on for determining occurrence liklihoods. As described in response F-19 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter, CNDDB was one of multiple factors used to determine the potential for special status species' occurrence on the project. Additional factors included a site visit with biologists familiar with the project location and the species known to occur in the area, type and quality of habitat present within and adjacent to the project, and environmental conditions of the site including soil types (some plants require particular soils) and elevation (plants and some animals only occur at certain elevation ranges). Special status species may utilize the project site or habitat adjacent to the project site; therefore, avoidance and minimization measures (BIO-1 through BIO-4) were proposed and will be implemented to reduce potential impacts to a less than significant level.
- **F B-14** This comment is an introduction to the comments made throughout this section of the comment letter. The comment states that impacts should not only include potentials for occurrence but also consider affects of the project on a larger scale. Please refer to response F-21, F-50,and F-51 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter which details that the Draft EIR was prepared in the typical manner, as required by wildlife agencies and under CEQA, and will comply with the Desert Renewable Energy Conservation Plan (DRECP) which considers impacts to environmental resources on a large scale.
- **F B-15** This comment states that the Draft EIR's analysis of project impacts on a wildlife corridor is inaccurate. In this section, Dr. Smallwood also states that a flock of tricolored blackbirds flew across the site; however, other sections of his letter, including his species list, state that he is uncertain they were tricolored blackbirds. Please refer to response F-20 and F-51 of the

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Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter for details on the topic of wildlife corridors. The project site is located within the boundaries of the DRECP, but is not within or adjacent to DRECP conservation areas or wildlife corridors. The DRECP includes 5 million acres of pre-existing conservation areas, 4.2 million acres of new conservation areas, and wildlife corridors and linkages for the protection of 50 special status species and 37 unique habitats. The project is required to comply with the DRECP. With DRECP compliance, development of the project would not substantially interfere 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.

- F B-16 This comment disccusess habitat loss. Please refer to response F-52 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter. A majority of the habitat on site is of low value due to disturbance and native vegetation present along jurisdictional features and within the railroad right-of-way will be avoided. Although some special status wildlife species may utilize the site, a disturbed site will have the least impact to wildlife compared to natural ecosystems. In addition, at the end of the project's operation term or should the project be decommissioned, the project applicant is required to deconstruct and restore land to its pre-project state. Therefore, the project will not have a significant impact to special status species based on habitat loss and with the implementation of BIO-1 through BIO-4 will reduce potential impacts to wildlife species will be reduced to a less than significant level.
- **F B-17** This comment addresses habitat loss, particularly in regards to bird reproduction. Please refer to response F-52 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter. The Draft EIR noted that there is a potential for nesting birds to be impacted by the project, therefore, the Draft EIR includes avoidance and minimization measures (BIO-1 through BIO-4), to reduce these potential impacts to a less than significant level.
- **F B-18** This comment also discusses loss of habitat. Please refer to response F-52 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter. The project will not have a significant impact to special status species based on habitat loss.
- F B-19 This comment discusses collision mortality to birds and possibly bats. According to the United States Fish and WIllidfe Service (USFWS), although direct impacts to birds may occur as a result of solar projects due to collisions with infrastructure, including security fencing, the long term indirect impacts benefit migratory birds by reducing the use a fossil fuels, a drive of climate change. Please refer to response F-53 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter for additional details. The avoidance and minimization measure BIO-1, will require that all electrical components on the project site be underground or protected so there will be no exposure to wildlife and therefore no potential for electricution. In addition, the DRECP allows for the development of 388,000 acres of renewable energy while providing protection and conservation of desert ecosystems (4.2 million acres in addition to the 5 million existing acres). As discussed in the DEIR, while the potential for impacts may exist, these impacts are considered less than significant with implementation of BIO-1 and adherance to the DRECP.
- **F B-20** This comment discusses collision mortality to birds and possibly bats. According to the USFWS, although direct impacts to birds may occur as a result of solar projects due to

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collisions with infrastructure, including security fencing, the long term indirect impacts benefit migratory birds by reducing the use a fossil fuels, a drive of climate change. Please also refer to response F-53 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter for additional details. In addition, the DRECP allows for the development of 388,000 acres of renewable energy while providing protection and conservation of desert ecosystems (4.2 million acres in addition to the 5 million existing acres). As discussed in the Draft EIR, while the potential for impacts may exist, these impacts are considered less than significant with implementation of BIO-1 and adherance to the DRECP.

- **F B-21** This comment discusses the potential for avian mortality due to gen-tie lines. Please refer to response F-53 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter. The avoidance and minimization measure BIO-1, will require that all electrical components on the project site be underground or protected so there will be no exposure to wildlife and therefore no potential for electricution. In addition, the DRECP allows for the development of 388,000 acres of renewable energy while providing protection and conservation of desert ecosystems (4.2 million acres in addition to the 5 million existing acres). As discussed in the Draft EIR, while the potential for impacts may exist, these impacts are considered less than significant with implementation of BIO-1 and adherance to the DRECP.
- F B-22 This comment discusses collision mortality to birds due to the security fencing proposed. According to the USFWS, although direct impacts to birds may occur as a result of solar projects due to collisions with infrastructure, including security fencing, the long term indirect impacts benefit migratory birds by reducing the use a fossil fuels, a drive of climate change. Please also refer to response F-53 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter. The avoidance and minimization measure BIO-1, will require that all electrical components on the project site be underground or protected so there will be no exposure to wildlife and therefore no potential for electricution. In addition, the DRECP allows for the development of 388,000 acres of renewable energy while providing protection and conservation of desert ecosystems (4.2 million acres in addition to the 5 million existing acres). As discussed in the DEIR, while the potential for impacts may exist, these potential impacts are reduced to a less than significant level with implementation of BIO-1 through BIO-4 and adherance to the DRECP.
- **F B-23** This comment discusses habitat loss and collision mortality. Please refer to response F-52 and F-53 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter. The DRECP allows for the development of 388,000 acres of renewable energy while providing protection and conservation of desert ecosystems (4.2 million acres in addition to the 5 million existing acres). As discussed in the Draft EIR, while the potential for impacts may exist, with the implementation of BIO-1 through BIO-4 and adherance to the DRECP, impacts are considered less than signifiant.
- **F B-24** This comment discusses cumulative impacts assocaited with collision mortality. Please refer to response F-55 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter. Cumulative impacts were addressed throughout the Draft EIR, and potential impacts were found to be less than significant with DRECP compliance.
- **F B-25** This comment continues the discussion on cumulative impacts. Please refer to response F-55 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry

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- ("Citizens") letter. Cumulative impacts were addressed throughout the Draft EIR, and potential impacts were found to be less than significant with DRECP compliance.
- **F B-26** This comment discusses habitat loss and collision mortality. Please refer to response F-52 and F-53 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter. As discussed in the Draft EIR, while the potential for impacts may exist, with the implementation of BIO-1 through BIO-4 and compliance with the DRECP, potential impacts are considered less than signifiant.
- **F B-27** This comment discusses habitat loss and collision mortality. Please refer to response F-52 and F-53 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter. As discussed in the Draft EIR, while the potential for impacts may exist, with the implementation of BIO-1 through BIO-4 and compliance with the DRECP, potential impacts are considered less than signifiant.
- **F B-28** This comment states that burrowing owl detection surveys should be completed prior to circulation of the Draft EIR. Take avoidance surveys, to identify if burrowing owl are present prior to construction, are required as indicated in BIO-3, and will be implemented to reduce any potential impacts to a less than significant level. As stated in the Draft EIR, the measures are implemented to avoid or minimize potential impacts. The goal of mitigation measures is to always avoid first, but when avoidance isn't possible, that impacts are minimized to the furthest extent feasible.
- **F B-29** This comment discusses that while nesting bird surveys are appropriate, habitat loss for birds is not addressed. Please refer to response F-52 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter. A majority of the habitat on site is non-native (252 of the 272 acres surveyed) and of low value to most wildlife species. In addition, native vegetation present along jurisdictional features and within the railroad right-ofway will be avoided. However, there is a potential for nesting birds to be impacted by the project, therefore, the Draft EIR includes avoidance and minimization measures (BIO-1 through BIO-4) including nesting bird surveys, to reduce these potential impacts to a less than significant level.
- **F B-30** This comment discusses compensatory mitigation as effective mitigation for the project. Please refer to response F-55 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter. As previously discussed, the Draft EIR evaluated impacts to biological resources. As concluded, while the potential for impacts may exist, with the implementation of BIO-1 through BIO-4 and compliance with the DRECP, impacts are considered less than significant. Biological conservation will be achieved with DRECP compliance.
- **F B-31** This comment discusses wildlife rehabilitation facilities as effective mitigation for the project. Please refer to response F-55 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter. As previously discussed, the Draft EIR evaluated impacts to biological resources. As concluded, while the potential for impacts may exist, with the implementation of BIO-1 through BIO-4 and compliance with the DRECP, impacts are considered less than significant. Biological conservation will be achieved with DRECP compliance.
- **F B-32** This comment discusses post-construction impacts monitoring as effective mitigation for the project. Please refer to response F-55 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter. As previously discussed, the Draft EIR

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- evaluated impacts to biological resources. As concluded, while the potential for impacts may exist, with the implementation of BIO-1 through BIO-4 and compliance with the DRECP, impacts are considered less than significant. Biological conservation will be achieved with DRECP compliance.
- **F B-33** This comment discusses including nocturnal survey with impacts montioing as effective mitigation for the project. Please refer to response F-55 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter. As previously discussed, the Draft EIR evaluated impacts to biological resources. As concluded, while the potential for impacts may exist, with the implementation of BIO-1 through BIO-4 and compliance with the DRECP, impacts are considered less than significant. Biological conservation will be achieved with DRECP compliance.
- **F B-34** This comment discusses fatality monitoring as effective mitigation for the project. Please refer to response F-55 of the Adams Broadwell Joseph & Cardozo on Behalf of Citizens for Responsible Industry ("Citizens") letter. As previously discussed, the Draft EIR evaluated impacts to biological resources. As concluded, while the potential for impacts may exist, with the implementation of BIO-1 through BIO-4 and compliance with the DRECP, impacts are considered less than significant. Biological conservation will be achieved with DRECP compliance.

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Letter F - Exhibit C

Letter to Kendra Hartmann, Adams Broadwell Joseph & Cardozo from Gregory and Henry House re: Initial comment on the Draft Environemntal Impact Report: Brawley Solar Energy Facility Project (February 9, 2022)

F C-1 This comment is an introductory comment. For clarification of the project's planned duration, Chapter 2.0, Project Description, of the Final EIR has been revised as follows:

2.6 Restoration of the Project Site

Electricity generated by the facility could be sold under the terms of a power purchase agreement (PPA) with a power purchaser (i.e., utility service provider). At the end of the PPA term, the owner of the facility may choose to enter into a subsequent PPA, update technology and re-commission, or decommission and remove the generating facility and its components. Solar equipment has a typical lifespan of approximatey 20 to 25 years, and with recent technology can have a lifespan of up to 30 years. Upon decommissioning, the site could be converted to other uses in accordance with applicable land use regulations in effect at that time. A collection and recycling program will be executed to promote recycling of project components and minimize disposal in landfills. All permits related to decommissioning would be obtained, where required.

- **F C-2** A project-specific Reclamation Plan will be prepared as required in Mitigation Measure AG-1b. The Reclamation Plan will document the procedures by which the project site will be returned to its current agricultural condition, including soil conditions. A typical restoration plan that has been approved by the County Agricultural Commissioner includes:
 - Exhibits indicating current conditions of the farm fields
 - Estimate of costs to restore land to farm ready conditions
 - Cost estimates include replacement of agricultural infrastructure, such as concrete irrigation ditches, subsurface tile drainage pipelines, deep chiseling (sub-soiling), discing, land planning and restoration of irrigation land slopes (land leveling)

Without agricultural tillage over the 25 to 30 year span of the PV solar energy generating facility operation, the clay soils are expected to become compacted. In order to ensure crop growth, the fields will likely need to be sub-soiled (plow shanks extending to 36" to 42"below ground surface), re-leveled with laser controlled drag-scrapers, manure fertilizer applied, disced (2 directions) and landplaned (or tri-planed). Soil samples would be collected from each field and analyzed for agronomic minerals, salts and fertilizer compounds prior to construction.

Permittee shall also provide financial assurance/bonding in the amount equal to a cost estimate prepared by a California-licensed general contractor or civil engineer for implementation of the Reclamation Plan in the even Permittee fails to perform the Reclamation Plan.

F C-3 As described on page 3.3-6 of the Draft EIR, "It is a policy of the County that leapfrogging will not be allowed in the future. All new non-agricultural development will be confined to areas identified in this plan for such purposes or in Cities' adopted Spheres of Influence, where new development must adjoin existing urban uses. Non-agricultural residential, commercial, or industrial uses will only be permitted if they adjoin at least one side of an existing urban use,

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and only if they do not significantly impact the ability to economically and conveniently farm adjacent agricultural land."

As described on page 3.3-7 of the Draft EIR, the project is adjacent to an existing urban use, the existing City of Brawley Wastewater Treatment Plant, which is along the western edge of the project site. The Union Pacific Railway transects the project site. Further, the Final EIR has been revised to describe that the project site is located within the City of Brawley's adopted Sphere of Influence². The following text has been added on page 3.3-7 of the Final EIR:

Furthermore, as shown on Figure LUE-1: Land Use Map of the City of Brawley Final General Plan 2030, the project site is located within the City of Brawley's adopted Sphere of Influence. As a new non-agricultural development, the proposed project would be consistent with this policy as it would be confined to areas in a city's adopted sphere of influence and adjoins an existing urban use (water treatment plant).

The Lead Agency has the authority to interpret the meaning of the General Plan and determine whether the proposed project, together with the mitigation measures set forth in the EIR and the conditions of approval mandated by a CUP, are consistent with the General Plan. Please also refer to response to comment D.2 related to the project's consistency with the RE Overlay Zone.

- **F C-4** Refer to response to comment F.37.
- F C-5 As described on page 2-16 of the DEIR, at the end of the PPA term, the owner of the facility may choose to enter into a subsequent PPA, update technology and re-commission, or decommission and remove the generating facility and its components. Upon decommissioning, the site could be converted to other uses in accordance with applicable land use regulations in effect at that time. The DEIR analyzes the environmental effects on the 30-year CUP followed by post-project restoration of the project site. The application of another CUP would be subject to additional CEQA review at the time an application is filed with the County. Any consideration of potential impacts to important farmlands would be based on future project details, which remain remote and speculative at this time.
- **F C-6** See response to comment F C-2.
- **F C-7** Project decommissioning would not occur until 30 years, or more if the owner chooses to enter into a subsequent PPA or update technology and re-commission the facility. It is speculative to assume that the Imperial Irrigation District would reallocate the irrigation water currently used by the subject property's crops to another use that is not for crop production in 30 years or more.
- **F C-8** See response to comment E.8.
- **F C-9** See responses to comments F C-1 through F C-8.
- **F C-10** Conclusion statement. No further response is required.

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² City of Brawley. 2008. Figure LUE-1: Land Use Map of the City of Brawley Final General Plan 2030. Available on-line at: https://www.brawley-ca.gov/cms/kcfinder/upload/files/planning/Final GP Master-PDF.pdf

0.2 Response to Comments Final EIR | Brawley Solar Energy Facility Project

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0.2-430 | January 2023 County of Imperial

0.3 Errata to the Draft EIR

A. Introduction

This section of the Final Environmental Impact Report (EIR) identifies the location of, or contains revisions to, information included in the Draft EIR dated December 2021, based upon additional or revised information required to prepare a response to a specific comment. The information added to the EIR does not meet the requirements for recirculation pursuant to Section 15088.5 of the State California Environmental Quality Act (CEQA) Guidelines.

The new information simply clarifies information presented in the Draft EIR. Text that has been added to the document appears in an underline format. Text that has been deleted appears with strikeout.

This Errata, in conjunction with the Final EIR, will be used by the County of Imperial in its evaluation and analysis of the proposed project and in the adoption of any findings required by law. Substantial evidence in support of findings may be found anywhere in the administrative record. (14CCR 15091(b)(e). The County of Imperial is designated the Lead Agency for California Environmental Quality Act (CEQA) compliance.

B. Corrections and Additions

Section 0 Executive Summary

Page ES-1:

Project Overview

The proposed project would be comprised of bifacial solar PV arrays panels, an on-site, 92/12 kilovolt (kV) substation, 40 MW battery storage system (BESS), generation tie-line (gen-tie), fiberoptic line and or microwave tower, inverters, transformers, underground electrical cables, and access roads.

Page ES-3:

Areas of Concern

Section 15123(b)(2) of the CEQA Guidelines requires that an EIR identify areas of controversy known to the Lead Agency, including issues raised by other agencies and the public as well as issues to be resolved. A primary issue associated with this solar farm project, and other solar facility projects that are proposed in the County, is the corresponding land use compatibility and fiscal/economic impacts to the County. Through the environmental review process for this project, other areas of concern and issues to be resolved include potential impacts related to the conversion of farmland to non-agricultural uses, damage to crops, wildlife, water supply, fire hazards associated with the battery energy storage system, health effects from air pollution, noise, and hazardous materials, waste, electromagnetic exposure safety, and change of visual character.

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Section 1 Introduction

Page 1-1:

1. General Plan Amendment. An amendment to the County's General Plan, Renewable Energy and Transmission Element is required to implement the proposed project. CUP applications proposed for specific renewable energy projects not located in the RE Overlay Zone would not be allowed without an amendment to the RE Overlay Zone. The northern portion of the project site (APNs 037-140-020 and 037-140-021) is located within the Geothermal Overlay Zone, which is considered as part of the RE Overlay Zone. However, the entire southern parcels of the project site (APNs 037-140-020, 037-140-021, 037-140-022, 037-140-023, and 037-140-006) is are located adjacent to, but outside of the RE Overlay Zone. Therefore, the applicant is requesting a General Plan Amendment to include/classify the southern three all-five project parcels into the RE Overlay Zone, so that the entire site would be located within the RE Overlay Zone. No change in the underlying General Plan land use (Agriculture) is proposed.

Page 1-6:

Availability of Reports

This The Draft EIR has been was distributed to various federal, state, regional, local agencies and interested parties for a 45-day public review period, from December 27, 2021 through February 10, 2022, in accordance with Section 15087 of the CEQA Guidelines. This The Draft EIR and documents incorporated by reference are were made available for public review at the County of Imperial Planning and Development Services Department, 801 Main Street, EI Centro, California 92243. Documents may be reviewed were available for review during regular business hours.

Comments received during the public review period of the Draft EIR will be have been reviewed and responded to in the this Final EIR. The Final EIR will then be reviewed by the Imperial County Planning Commission and Board of Supervisors as a part of the procedure to adopt the EIR. Additional information on this process may be obtained by contacting the County of Imperial Planning and Development Services Department at (442) 265-1736.

Page 1-8:

Areas of Concern and Issues to be Resolved

Section 15123(b)(2) of the CEQA Guidelines requires that an EIR identify areas of controversy known to the Lead Agency, including issues raised by other agencies and the public as well as issues to be resolved. A primary issue associated with this solar farm project, and other solar facility projects that are proposed in the County, is the corresponding land use compatibility and fiscal/economic impacts to the County. Through the environmental review process for this project, other areas of concern and issues to be resolved include potential impacts related to the conversion of farmland to non-agricultural uses, damage to crops, wildlife, water supply, fire hazards associated with the battery energy storage system, health effects from air pollution, noise, and hazardous materials, waste, electromagnetic exposure safety, and change of visual character.

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Page 1-9:

Document Organization

The structure of the Draft Final EIR is identified below. The Draft Final EIR is organized into 10 14 chapters, including the Executive Summary.

- <u>Chapter 0.1 Introduction and Summary describes the CEQA requirements and content</u> of the Final EIR.
- Chapter 0.2 Responses to Comment Letters Received on the Draft EIR provides copies of the comment letters received and individual responses to written comments.
- Chapter 0.3 Errata to the Draft EIR identifies the location of, or contains revisions to, information included in the Draft EIR dated December 2021, based upon additional or revised information required to prepare a response to a specific comment.
- Chapter 0.4 Mitigation Monitoring and Reporting Program identifies the mitigation measures, timing, and responsibility for implementation of the measures.

Section 2 Project Description

Page 2-1:

Project Location

Currently, the project site contains alfalfa fields within different levels of harvest. North and east of the project site is undeveloped agricultural land. South of the project site is a mixture of undeveloped agricultural land and dirt lots used for staging activities. The Del Rio Country Club golf course is located to the south of the site. The City of Brawley Wastewater Treatment Plant (WWTP) is located along the western edge of the project site.

Page 2-4:

Renewable Energy Overlay Zone

As shown on Figure 2-1, the northern portion of the project site (APNs 037-140-020 and 037-140-021) is located within the Geothermal Overlay Zone, which is considered as part of the RE Overlay Zone. However, the entire southern parcels of the project site (APNs 037-140-020, 037-140-021, 037-140-022, 037-140-023, and 037-140-006) is are located adjacent to, but outside of the RE Overlay Zone. Therefore, the applicant is requesting a General Plan Amendment to include/classify all five the southern three project parcels into the RE Overlay Zone, so that the entire site would be located within the RE Overlay Zone. No change in the underlying General Plan land use (Agriculture) is proposed.

Project Characteristics

The proposed project involves the construction and operation of a 40 MW PV solar facility with an integrated 40 MW BESS (not to exceed 80 MW) on approximately 227 acres of privately-owned land. The proposed project would be comprised of bifacial solar PV arrays panels, an on-site substation, BESS, generation tie-line (gen-tie), fiberoptic line and or microwave tower, inverters, transformers, underground electrical cables, access roads. These project components are described in detail below and depicted in Figure 2-3.

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Page 2-8:

2.3.5 Fiberoptic Cable and or Microwave Tower

The maximum height limit for non-residential structures and commercial communication towers in the A-2 zone is 120 feet. The proposed 40 to 100-feet tall microwave tower would not exceed the height limit in the A-2 zone.

Page 2-8:

Gen-Tie Line

The maximum height limit for non-residential structures and commercial communication towers in the A-2 zone is 120 feet. The proposed project's 66-foot-high gen-tie poles would not exceed the height limit in the A-2 zone.

Security

Six-foot high chain link fencing topped with barbed wire would be installed around the perimeter of the project site at the commencement of construction and site access would be limited to authorized site workers. Figure 2-4 shows the project's conceptual fencing plan. Points of ingress/egress would be accessed via locked gates. In addition, a motion detection system and closed-circuit camera system may also be installed. The site would be remotely monitored 24 hours per day, 7 days per week. In addition, routine unscheduled security rounds may be made by the security team monitoring the site security.

The City of Brawley WWTP is located along the western edge of the project site. Access to a portion of the WWTP is facilitated through an easement that was granted in 2007. The easement applies to the portion of the access road that runs in an easterly/westerly direction from N Best Road. The City relies upon the unimproved road continuing from the easement to the south/southwest to provide staff access to the WWTP, allow for vacuum trucks to transport wastewater to the facility and to transport solids generated by the WWTP to licensed Class I landfills, and provide access for heavy vehicles/equipment for materials delivery, maintenance repair and system upgrade purposes. As shown on Figure 2-4, the WWTP's access road and access points are located outside of the proposed project's fence. The proposed project would be constructed so as to not interfere with the WWTP's existing access.

Page 2-10:

Added Figure 2-4 Proposed Access and Fencing Plan.

Page 2-12:

Site Access

As shown in <u>Figure 2-4</u> Figure 2-3, primary access to the project site would be located off N Best Avenue. A secondary emergency access road would be located in the northwest portion of the project site. Access roads would be constructed with an all-weather surface, to meet the County Fire Department's standards. Points of ingress/egress would be accessed via locked gates that can be opened by any emergency responders. An all-weather surface access road would surround the perimeter of the project site, as well as around solar blocks no greater than 500 by 500 feet.

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Page 2-13:

Construction Schedule, Sequence, and Phasing

Construction is anticipated to start in quarter four two of 2021 2023 and would take approximately 6-9 months to complete. Construction would commence only after all required permits and authorizations have been secured. Construction would generally occur during daylight hours, Monday through Friday. However, non-daylight work hours may be necessary to make up schedule deficiencies, or to complete critical construction activities. For example, during hot weather, it may be necessary to start work earlier to avoid pouring concrete during high ambient temperatures. If construction is to occur outside of the County's specified working hours, permission in writing will be sought at the time. The County's construction equipment operation shall be limited to the hours of 7 a.m. to 7 p.m., Monday through Friday, and 9 a.m. to 5 p.m. on Saturday. No commercial construction operations are permitted on Sunday or holidays.

Page 2-14:

Site Preparation

Project construction would include the renovation of existing dirt roads to all-weather surfaces (to meet the County standards) from N Best Avenue to the City of Brawley wastewater treatment plant. Construction of the proposed project would begin with clearing of existing brush and installation of fencing around the project boundary. Figure 2-4 shows the project's conceptual fencing plan. Fencing would consist of a six-foot chain-link fence topped with barbed wire. A 20-foot road of engineering-approved aggregate would surround the site within the fencing.

Project construction would include the renovation of existing dirt roads within the project site, to all-weather surfaces (to meet the County standards). If agreeable by the City of Brawley, the roadways outside the project site would also be renovated to all-weather surfaces to improve the roadway from N Best Avenue to the City of Brawley WWTP. These improvements would be coordinated with the City of Brawley.

Material and equipment staging areas would be established on-site or at the existing North Brawley Geothermal Power Plant within in an approximate 4-acre area. The staging area would include an air-conditioned temporary construction office, a first-aid station and other temporary facilities including, but not limited to, sanitary facilities, worker parking, truck loading and unloading, and a designated area for assembling the support structures for the placement of PV modules. The size of the staging area would shrink as construction progresses throughout the project site. The project construction contractor would then survey, clear and grade road corridors in order to bring equipment, materials, and workers to the various areas under construction within the project site. Road corridors buried electrical lines, PV array locations and locations of other facilities may be flagged and staked in order to guide construction activities.

Page 2-16:

2.5 Operations and Maintenance

Once fully constructed, the project would be operated on an unstaffed basis and be monitored remotely, with periodic on-site personnel visitations for security, maintenance and system monitoring.

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Therefore, no full-time site personnel would be required on-site during operations and approximately two employees would only be onsite up to four times per year to wash the solar panels. As the project's PV arrays produce electricity passively, maintenance requirements are anticipated to be very minimal. Any required planned maintenance activities would generally consist of equipment inspection and replacement and would be scheduled to avoid peak load periods. Any unplanned maintenance would be responded to as needed, depending on the event.

Operation of the proposed project would require upgrades including but not limited to relay upgrades, Phasor Measurement Unit Requirements, Relay, SCADA, Metering and Telecom upgrades at both the proposed substation and North Brawley Geothermal Power Plant substation. The construction and operation of these upgrades by IID required to adequately operate the project are included as part of the project and project analysis.

Page 2-16:

2.6 Restoration of the Project Site

Electricity generated by the facility could be sold under the terms of a power purchase agreement (PPA) with a power purchaser (i.e., utility service provider). At the end of the PPA term, the owner of the facility may choose to enter into a subsequent PPA, update technology and re-commission, or decommission and remove the generating facility and its components. Solar equipment has a lifespan of approximatey 20 to 25 years, and with recent technology can have a lifespan of up to 30 years. Upon decommissioning, the site could be converted to other uses in accordance with applicable land use regulations in effect at that time. A collection and recycling program will be executed to promote recycling of project components and minimize disposal in landfills. All permits related to decommissioning would be obtained, where required.

Page 2-17:

1. General Plan Amendment. An amendment to the County's General Plan, Renewable Energy and Transmission Element is required to implement the proposed project. CUP applications proposed for specific renewable energy projects not located in the RE Overlay Zone would not be allowed without an amendment to the RE Overlay Zone. As shown in Figure 2-1, the northern portion of the project site (APNs 037-140-020 and 037-140-021) is located within the Geothermal Overlay Zone, which is considered as part of the RE Overlay Zone. However, the entire southern parcels of the project site (APNs 037-140-020, 037-140-021, 037-140-022, 037-140-023, and 037-140-006) are is located adjacent to, but outside of the RE Overlay Zone. Therefore, the applicant is requesting a General Plan Amendment to include/classify the southern three all five project parcels into the RE Overlay Zone, so that the entire site would be located within the RE Overlay Zone. No change in the underlying General Plan land use (Agriculture) is proposed.

Section 3.3 Agricultural Resources

Page 3.3-7:

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Table 3.3-2. Project Consistency with Applicable General Plan Agricultural Policies

Tuble 6.6 2. 1 Toject Generationey	Consistency with General	
General Plan Policies	Plan	Analysis
Goal 2. Adopt policies that prohibit "leapfrogging" or "checkerboard" patterns of nonagricultural development in agricultural areas and confine future urbanization to adopted Sphere of Influence area.	Consistent	The project site is designated for agriculture land use in the County General Plan. The project would include development of a solar facility and associated infrastructure adjacent to productive agricultural lands to the north and east of the project site; however, the project is located adjacent to the City of Brawley Wastewater Treatment Plant along the western edge of the project site. The Union Pacific Railway transects the project site. Additionally, this development would not include a residential component that would induce urbanization adjacent to the projects. Furthermore, as shown on Figure LUE-1: Land Use Map of the City of Brawley Final General Plan 2030, the project site is located within the City of Brawley's adopted Sphere of Influence ¹ . As a new non-agricultural development, the proposed project would be consistent with this policy as it would be confined to areas in a city's adopted sphere of influence and adjoins an existing urban use (water treatment plant).
		Furthermore, with the approval of a General Plan Amendment, Zone Change, and CUP, the
		project would be consistent with the County's Land Use Ordinance. Consistency with the Land
		Use Ordinance implies consistency with the General Plan land use designation.

Page 3.3-13:

The County is responsible for approving the reclamation plan for each project and confirming that financial assurances for the project is in conformance with Imperial County ordinances prior to the issuance of any building permits. This shall be made a condition of approval and included in the CUP.

Section 3.4 Air Quality

Page 3.4-18:

Table 3.4-9. Project Operational Emissions

Activity	Pollutant (pounds per day)								
	ROG	NOx	со	SO ₂	PM ₁₀	PM _{2.5}			
Area Sources ¹	5.35	0.00	0.04	0.00	0.00	0.00			
Energy Usage ²	0.00	0.00	0.00	0.00	0.00	0.00			

¹ City of Brawley. 2008. Figure LUE-1: Land Use Map of the City of Brawley Final General Plan 2030. Available on-line at: https://www.brawley-ca.gov/cms/kcfinder/upload/files/planning/Final GP Master-PDF.pdf

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Mobile Sources ³	0.17	0.18	1.31	0.00	2.35 <u>32.91</u>	0.27 3.78
Backup Generator ⁴	0.05	0.17	0.18	0.00	0.01	0.01
Total Emissions	5.57	0.35	1.53	0.00	2.35 32.92	0.28 <u>3.78</u>
ICAPCD Significance Threshold	137	137	150	550	550	150
Exceed ICAPCD Significance Threshold?	No	No	No	No	No	No

Source: Appendix C of this EIR

Notes:

- ¹ Area sources consist of emissions from consumer products, architectural coatings, and landscaping equipment.
- ² Energy usage consist of emissions from natural gas usage (no natural gas usage during operation of the project).
- Mobile sources consist of emissions from vehicles and road dust.
- ⁴ Backup Generator based on a 20 kW (62 Horsepower) diesel generator that has a cycling schedule of 30 minutes per week.

Section 3.9 Hazards and Hazardous Materials

Page 3.9-1:

The Envirostor Database from the California <u>Department of Toxic Substances Control</u> (DTSC) records was reviewed for known contamination or sites for which there may be reason to investigate further. A desktop review was completed on September 14, 2021, for the project site. Two Leaking Underground Storage Tanks (LUST) were identified within 1 mile of the project site; however, both cases have been completed and are closed. No reported cases were found on the project sites and no active sites have been identified within 1-mile of the project site.

Page 3.9-10:

The nearest public airport is the Brawley Municipal Airport located approximately 1.5 miles south of the project site. However, the project site is outside of the airport compatibility zones of the Brawley Municipal Airport (County of Imperial 1996). Additionally, as discussed in Section 3.2, Aesthetics, the project would not expose approach slopes associated with the Brawley Municipal Airport to glare hazards. Furthermore, on May 18, 2022, the Imperial County Airport Land Use Commission determined that the proposed project is compatible with the ALUCP. Therefore, implementation of the proposed project would not result in a safety hazard or excessive noise for people residing or working in the project area and no impact would occur. No significant impact is identified for this issue area.

Section 3.10 Hydrology/Water Quality

Page 3.10-16:

The project site would remain largely impervious over the operational life of the project.

Page 3.10-17:

Lastly, the project site would remain largely impervious over the operational life of the project.

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Page 3.10-18:

The project site would remain largely impervious over the operational life of the project.

Section 3.11 Land Use/Planning

Page 3.11-4:

As discussed in Chapter 2, the County adopted the Renewable Energy and Transmission Element, which includes a RE Zone (RE Overlay Map). The RE Overlay Zone is concentrated in areas determined to be the most suitable for the development of renewable energy facilities while minimizing the impact on other established uses. As shown on Figure 3.11-2, the northern portion of the project site (APNs 037-140-020 and 037-140-021) is located within the Geothermal Overlay Zone, which is a component of the RE Overlay Zone. However, the entire southern portion of the project site (APNs 037-140-022, 037-140-023, and 037-140-006) is located adjacent to, but outside of the RE Overlay Zone. The applicant is requesting a General Plan Amendment to include/classify the southern three project parcels into the RE Overlay Zone, so that the entire site would be located within the RE Overlay Zone. No change in the underlying General Plan land use (Agriculture) is proposed.

Page 3.11-5:

County of Imperial General Plan

The RE and Transmission Element includes a RE Zone (RE Overlay Map). The County Land Use Ordinance, Division 17, includes the RE Overlay Zone, which authorizes the development and operation of RE projects, with an approved CUP. The RE Overlay Zone is concentrated in areas determined to be the most suitable for the development of RE facilities while minimizing the impact to other established uses. As <u>discussed previously and</u> shown on Figure 3.11-2, the <u>northern portion of the project site is located within the RE Overlay Zone; whereas the southern portion of the project site is outside of the RE Overlay Zone.</u>

Page 3.11-7:

Table 3.11-2. Project Consistency with Applicable General Plan Policies

Public Facilities, Objective 8.8. Ensure that the siting of future facilities for the transmission of electricity, gas, and telecommunications is compatible with the environment and County regulation.	Consistent	The County Land Use Ordinance, Division 17, includes the Renewable Energy Overlay Zone, which authorizes the development and operation of renewable energy projects with an approved CUP. The RE Overlay Zone is concentrated in areas determined to be the most suitable for the development of renewable energy facilities while minimizing the impact on other established uses. CUP applications proposed for specific renewable energy projects not located in the RE Overlay Zone would not be allowed without an amendment to the RE Overlay Zone.
		The County's General Plan and Land Use Ordinance allows that for renewable energy projects proposed on land classified in a non-RE Overlay zone, that the land on which the project is located may be included/classified in the RE Overlay Zone if the renewable energy project: 1) would be located adjacent to an existing RE Overlay Zone; 2) is not located in a sensitive

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area; 3) is located in proximity to renewable energy infrastructure; and, 4) and would not result in any significant environmental impacts.

As shown on Figure 3.11-2, the northern portion of the project site is located within the RE Overlay Zone, as the RE Overlay Zone includes the Geothermal Overlay Zone. However, the southern portion of the entire-project site is located outside, but immediately adjacent to ef the RE Overlay Zone. Therefore, the applicant is requesting a General Plan Amendment to include/classify the southern three all five project parcels into the RE Overlay Zone. With the approval of the General Plan Amendment, CUP, and zone change to include/reclassify all the project parcels to A-2-REG the proposed solar project can be implemented.

Page 3.11-10:

Table 3.11-2. Project Consistency with Applicable General Plan Policies

Protection of Open Space and	Consistent	As shown on Figure 3.11-2, the northern portion
Recreational Opportunities. Objective 8.2:		of the project site is located within the RE
Focus all new renewable energy		Overlay Zone, as the Geothermal Overlay Zone
development within adopted Renewable		is a component of the RE Overlay Zone.
Energy Overlay Zones.		However, the entire southern portion of the
		project site is located outside, but immediately
		adjacent to of-the RE Overlay Zone. The project
		applicant is requesting a General Plan
		Amendment and Zone Change to include/classify
		all five project the southern three parcels into the
		RE Overlay Zone, and a Zone Change to
		include/classify all five project parcels into the
		Renewable Energy/Geothermal (REG) Overlay
		Zone (A-2-REG). With the approval of the
		General Plan Amendment, Zone Change, and
		CUP, the proposed solar project can be
		implemented.

Page 3.11-13:

The maximum height limit for non-residential structures and commercial communication towers in the A-2 zone is 120 feet. The proposed project's 66-foot-high gen-tie poles and 40 to 100-feet tall microwave tower would not exceed the height limit in the A-2 zone.

Page 3.11-15:

As shown on Figure 3.11-2, the northern portion of the project site (APNs 037-140-020 and 037-140-021) is located within the Geothermal Overlay Zone, which is a component of the RE Overlay Zone. However, the entire-southern portion of the project site (APNs 037-140-006, 037-140-022 and 037-140-023) project site is located outside, but immediately adjacent to, of the RE Overlay Zone. Therefore, the project applicant is seeking a zone change to include/classify all five project parcels into the Renewable Energy/Geothermal (REG) Overlay Zone (A-2-REG).

The project applicant is requesting a General Plan Amendment to include/classify the southern three parcels into the RE Overlay Zone, and a Zone Change to include/classify all five project parcels into the Renewable Energy/Geothermal (REG) Overlay Zone (A-2-REG). Additionally, the project applicant and is requesting approval of a CUP by the County to allow for the construction and operation of the

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proposed solar energy facility with an integrated battery storage system. The project site is <u>currently located within</u>, and <u>adjacent to not located adjacent to</u> an existing RE Overlay Zone; and <u>meets the adjacency criteria</u> as the project site is not located in a sensitive area, and would not result in any <u>significant impacts with the implementation of proposed mitigation. therefore tThe project will need to also meets</u> the criteria identified for the "Island Overlay" to obtain approval of an amendment to the RE Overlay Zone. Table 3.11-3 provides an analysis of the project's consistency with the "Island Overlay" criteria.

Page 3.11-15:

Imperial County Airport Land Use Compatibility Plan

As previously discussed above, the project site is located approximately 1.5 miles north of the Brawley Municipal Airport. According to Figure 3A (Compatibility Map – Brawley Municipal Airport) of the ALUCP, no portion of the project site is located within the Brawley Municipal Airport land use compatibility zones (County of Imperial 1996). On May 18, 2022, the Imperial County Airport Land Use Commission determined that the proposed project is compatible with the ALUCP. Therefore, the proposed project would not conflict with the Imperial County ALUCP, and no significant impact would occur.

Section 5 Cumulative Impacts

Pages 5-7 through 5-8:

As discussed in Section 3.3, Agricultural Resources, the majority of the project site is designated as Farmland of Statewide Importance, with a pocket of Prime Farmland and Farmland of Local Importance located in the southern portion of the project site. Approximately 1 acre of Unique Farmland occurs along the western boundary of the project site. Therefore, the proposed project would convert land designated as Prime Farmland, Farmland of Statewide Importance, and Unique Farmland to non-agricultural uses, and, as such, incrementally add to the conversion of agricultural land in Imperial County. According to the California Farmland Conversion Report, approximately half of the County (522,375 acres out of a total of 1,028,508 acres) is Important Farmland (DOC 2018). Table 5-2 summarizes the percentage of each type of farmland in the County that would be converted by the proposed project. As shown in Table 5-2, the project would temporarily convert a very small fraction of the total Important Farmlands in the County and have a minimal effect on agricultural land on a cumulative scale. Furthermore, the conversion would be temporary, lasting only for the duration of the project's useful life, which is expected to be 20-25 years.

Table 5-2. Important Farmland Conversion

Land Use Category	Total Acreage in Imperial County	<u>Project-Related</u> Conversion (acres)	Project Percent of County Acreages (%)
Prime Farmland	<u>189,163</u>	<u>4.4</u>	<u><0.01%</u>
Farmland of Statewide Importance	<u>291,596</u>	<u>205</u>	0.07%
<u>Unique Farmland</u>	<u>1,905</u>	<u>1.0</u>	<u>0.05%</u>
Farmland of Local Importance	<u>39,711</u>	<u>12</u>	0.03%
<u>Total</u>	<u>522,375</u>	<u>222.4</u>	<u>0.04%</u>

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Source: DOC 2018

Pages 5-14 through 5-15:

Surface waters in the Imperial Valley ultimately drain into the Salton Sea via the New and Alamo Rivers as well as via irrigation drains and canals. Due to increased demand for water supplies in the region and IID water transfer agreements, increasing amounts of water are being consumed in Imperial Valley. In addition, water is also being transferred out of the Valley to population centers such as San Diego County, thus reducing inflows to the Salton Sea. Project implementation would not substantially alter the existing drainage pattern of the site or area. The majority of the project site would continue to sheet flow through the pervious native soils. The reduction of runoff to the Salton Sea during project construction and operation is not expected to combine with similar impacts of large scale proposed, approved and reasonably foreseeable renewable energy projects identified in Table 5-1. Likewise, cumulative impacts associated with runoff reduction would be less than cumulatively considerable.

Section 7 Alternatives

Page 7-9:

Alternative 2: Development within Renewable Energy Overlay Zone – Agricultural Lands

Given that Because the southern three parcels of the proposed project is are not located within the County's RE Overlay Zone, the purpose of this alternative is to develop a project alternative within the existing boundary of County's RE Overlay Zone. The RE Overlay Zone is concentrated in areas determined to be the most suitable for the development of renewable energy facilities while minimizing the impact on other established areas.

Section 8 References

Page 8-2

______ 2008. City of Brawley Final General Plan 2030. Available on-line at: https://www.brawley-ca.gov/cms/kcfinder/upload/files/planning/Final GP Master-PDF.pdf

Section 9 EIR Preparers and Persons and Organizations Contacted

Page 9-2:

Persons and Organizations Contacted

The following persons and organizations were contacted in preparation of this document:

- Imperial Irrigation District
- <u>City of Brawley, Public Works Department</u>

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C. California Environmental Quality Act Requirements and Findings Supporting Decision Not to Recirculate

CEQA Section 15088.5(e) requires that an EIR which has been made available for public review, but not yet certified, be recirculated whenever significant new information has been added to the EIR. The entire document need not be recirculated, if revisions are limited to specific portions of the document. The recirculated portions or document must be sent to responsible and trustee agencies for consultation and fresh public notice must be given in the manner provided for a draft EIR. However, new information is not presumed to be significant simply because it is new. Indeed, pursuant to State CEQA Guidelines Section 15088.5:

New information added to an EIR is not "significant" unless the EIR is changed in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect . . . that the project's proponents have declined to implement. State CEQA Guidelines, § 15088.5(a):

In order to be "significant," the new information requiring recirculation includes, for example, a disclosure showing that:

- (1) A new significant environmental impact would result from the project or from a new mitigation measure proposed to be implemented.
- (2) A substantial increase in the severity of an environmental impact would result unless mitigation measures are adopted that reduce the impact to a level of insignificance.
- (3) A feasible project alternative or mitigation measure considerably different from other previously analyzed would clearly lessen the environmental impacts of the project, but the project's proponent decline to adopt it.
- (4) The draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded. (State CEQA Guidelines, §15088.5(a)(1)-(4); *Laurel Heights II*, 6 Cal.4th at 1120.)

It is common, and in most cases necessary, to amplify and elaborate on the analysis of an EIR. CEQA anticipates this and such amplification does not constitute significant new "information" unless it triggers one of the four categories described in State CEQA Guidelines Section 15088.5(a). State CEQA Guidelines Section 15088.5(b) provides that "recirculation is not required where the new information added to the EIR merely clarifies or amplifies or makes insignificant modifications in an adequate EIR."

Based upon review of the minor corrections and additions identified in Section B above, the minor corrections and additions do not result in any new or substantially increased significant impacts. Therefore, the County has concluded that recirculation of the Draft EIR is not required.

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0.4 Mitigation Monitoring and Reporting Program

The County of Imperial will adopt this Mitigation Monitoring and Reporting Program (MMRP) in accordance with Public Resources Code (PRC) Section 21081.6 and Section 15097 of the California Environmental Quality Act (CEQA) Guidelines. The purpose of the MMRP is to ensure that the Brawley Solar Energy Facility Project, which is the subject of the Environmental Impact Report (EIR), complies with all applicable environmental mitigation requirements. The mitigation measures for the project will be adopted by the County of Imperial, in conjunction with the certification of the Final EIR. The mitigation measures have been integrated into this MMRP.

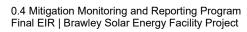
The mitigation measures are provided in Table 0.4-1. The specific mitigation measures are identified, as well as the monitoring method, responsible monitoring party, monitoring phase, verification/approval party, date mitigation measure verified or implemented, location of documents (monitoring record), and completion requirement for each mitigation measure.

The mitigation measures applicable to the project include avoiding certain impacts altogether, minimizing impacts by limiting the degree or magnitude of the action and its implementation, and/or reducing or eliminating impacts over time by maintenance operations during the life of the action.

Public Resources Code Section 21081.6 requires the Lead Agency, for each project that is subject to CEQA, to monitor performance of the mitigation measures included in any environmental document to ensure that implementation does, in fact, take place. The County of Imperial is the designated CEQA lead agency for the Mitigation Monitoring and Reporting Program. The County of Imperial is responsible for review of all monitoring reports, enforcement actions, and document disposition as it relates to impacts within the County's jurisdiction. The County of Imperial will rely on information provided by the monitor as accurate and up to date and will field check mitigation measure status as required.

A record of the MMRP will be maintained at County of Imperial, Department of Planning and Development Services, 801 Main Street, El Centro, CA 92243. All mitigation measures contained in the EIR shall be made conditions of the project as may be further described below.

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Table 0.4-1. Mitigation Measures

Table 0.4-1. IV	litigation Measures							
MM No.	Mitigation Measure	Monitoring Method	Responsible Monitoring Party	Monitoring Phase	Verification/Approval Party	Date Mitigation Measure Verified or Implemented	Location of Documents (Monitoring Record)	Completion Requirement
Agricultural Res	sources							
AG-1a	AG-1a Payment of Agricultural and Other Benefit Fees. One of the following options included below is to be implemented prior to the issuance of a grading permit or building permit for the project: Mitigation for Non-Prime Farmland Option 1: Provide Agricultural Conservation Easement(s). The Permittee shall procure Agricultural Conservation Easements on a "1 on 1" basis on land of equal size, of equal quality farmland, outside the path of development. The conservation easement shall meet DOC regulations and shall be recorded prior to issuance of any grading or building permits; or Option 2: Pay Agricultural In-Lieu Mitigation Fee. The Permittee shall pay an "Agricultural In-Lieu Mitigation Fee" in the amount of 20 percent of the fair market value per acre for the total acres of the proposed site based on five comparable sales of land used for agricultural purposes as of the effective date of the permit, including program costs on a cost recovery/time and material basis. The Agricultural In-Lieu Mitigation Fee, will be placed in a trust account administered by the Imperial County Agricultural Commissioner's office and will be used for such purposes as the acquisition, stewardship, preservation and enhancement of agricultural lands within Imperial County; or, Option 3: Public Benefit Agreement. The Permittee and County voluntarily enter into an enforceable Public Benefit Agreement or Development Agreement that includes an Agricultural Benefit Fee payment that is 1) consistent with Board Resolution 2012 005; 2) the Agricultural Benefit Fee must be held by the County in a restricted account to be used by the County only for such purposes as the stewardship, preservation and enhancement of agricultural lands within Imperial County and to implement the goals and objectives of the Agricultural Benefit program, as specified in the Development Agreement, including addressing the mitigation of agricultural job loss on the local economy. Mitigation for Prime Farmland Option 1: Provide Agricultural Conservation Easemen	Prior to the issuance of a grading permit, Planning and Development Services shall verify that the applicant has implemented one of the following mitigation options for Non-Prime Farmland: procured a conservation easement, paid an agricultural in-lieu mitigation fee, or entered into an enforceable Public Benefit Agreement or Development Agreement with the County. Prior to the issuance of a grading permit, Planning and Development Services shall verify that the applicant has implemented one of the following mitigation options for Prime Farmland: procured a conservation easement, paid an in-lieu mitigation fee, entered into an enforceable Public Benefit Agreement or Development Agreement with the County, or submitted a revised applicable CUP application and associated site plan(s).	Department of Planning and Development Services	Prior to issuance of a grading permit	Department of Planning and Development Services			

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Table 0.4-1. Mitigation Measures

Table 0.4-1.	Mitigation Measures							
MM No.	Mitigation Measure	Monitoring Method	Responsible Monitoring Party	Monitoring Phase	Verification/Approval Party	Date Mitigation Measure Verified or Implemented	Location of Documents (Monitoring Record)	Completion Requirement
	Conservation Easements on a "2 on 1" basis on land of equal size, of equal quality farmland, outside the path of development. The conservation easement shall meet DOC regulations and shall be recorded prior to issuance of any grading or building permits; or							
	Option 2: Pay Agricultural In-Lieu Mitigation Fee. The Permittee shall pay an "Agricultural In-Lieu Mitigation Fee" in the amount of 30 percent of the fair market value per acre for the total acres of the proposed site based on five comparable sales of land used for agricultural purposes as of the effective date of the permit, including program costs on a cost recovery/time and material basis. The Agricultural In-Lieu Mitigation Fee, will be placed in a trust account administered by the Imperial County Agricultural Commissioner's office and will be used for such purposes as the acquisition, stewardship, preservation and enhancement of agricultural lands within Imperial County; or,							
	Option 3: Public Benefit Agreement. The Permittee and County voluntarily enter into an enforceable Public Benefit Agreement or Development Agreement that includes an Agricultural Benefit Fee payment that is 1) consistent with Board Resolution 2012 005; 2) the Agricultural Benefit Fee must be held by the County in a restricted account to be used by the County only for such purposes as the stewardship, preservation and enhancement of agricultural lands within Imperial County and to implement the goals and objectives of the Agricultural Benefit program, as specified in the Development Agreement, including addressing the mitigation of agricultural job loss on the local economy; the Project and other recipients of the Project's Agricultural Benefit Fee funds; or emphasis on creation of jobs in the agricultural sector of the local economy for the purpose of off-setting jobs displaced by this Project. Option 4: Avoid Prime Farmland. The Permittee must revise their CUP Application/Site Plan to avoid Prime Farmland.							
AG-1b	AG-1b Site Reclamation Plan. The DOC has clarified the goal of a reclamation and decommissioning plan: the land must be restored to land which can be farmed. In addition to Mitigation Measure AG-1a for Prime Farmland and Non-Prime	Prior to the issuance of a grading permit, Planning and Development Services Department shall review and approve the Reclamation Plan.	Department of Planning and Development Services	Prior to the issuance of a grading permit	Department of Planning and Development Services			

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Table 0.4-1. Mitigation Measures

Table 0.4-1	. Mitigation Measures					1		
					Verification/Approval	Date Mitigation Measure Verified or	Location of Documents	Completion
MM No.	Mitigation Measure	Monitoring Method	Responsible Monitoring Party	Monitoring Phase	Party	Implemented	(Monitoring Record)	Requirement
	Farmland, the Applicant shall submit to Imperial County, a Reclamation Plan prior to issuance of a grading permit. The Reclamation Plan shall document the procedures by which the project site will be returned to its current agricultural condition. Permittee shall also provide financial assurance/bonding in the amount equal to a cost estimate prepared by a California licensed general contractor or civil engineer for implementation of the Reclamation Plan in the even Permittee fails to perform the Reclamation Plan.	Planning and Development Services shall also verify that the Permittee has provided financial assurance/bonding.						
AG-2	Pest Management Plan. Prior to the issuance of a grading permit or building permit (whichever occurs first), a Pest Management Plan shall be developed by the project applicant and approved by the County of Imperial Agricultural Commissioner. The project applicant shall maintain a Pest Management Plan until reclamation is complete. The plan shall provide the following:	The Department of Planning and Development Services shall verify that a Pest Management Plan has been reviewed and approved by the Imperial County Agricultural Commissioner.	Department of Planning and Development Services and Imperial County Agricultural Commissioner	Prior to the issuance of a grading permit or building permit, during construction	Department of Planning and Development Services and Imperial County Agricultural Commissioner			
	 Monitoring, preventative, and management strategies for weed and pest control during construction activities at any portion of the project (e.g., transmission line); 							
	Control and management of weeds and pests in areas temporarily disturbed during construction where native seed will aid in site revegetation as follows:							
	 Monitor for all pests including insects, vertebrates, weeds, and pathogens. Promptly control or eradicate pests when found, or when notified by the Agricultural Commissioner's office that a pest problem is present on the project site. The assistance of a licensed pest control advisor is recommended. All treatments must be performed by a qualified applicator or a licensed pest control business; 							
	 All treatments must be performed by a qualified applicator or a licensed pest control operator; 							
	 "Control" means to reduce the population of common pests below economically damaging levels, and includes attempts to exclude pests before infestation, and effective control methods after infestation. 							

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Table 0.4-1. Mitigation Measures

Table 0.4-1.	witigation measures					Date Mitigation		
MM No.	Mitigation Measure	Monitoring Method	Responsible Monitoring Party	Monitoring Phase	Verification/Approval Party	Measure Verified or Implemented	Location of Documents (Monitoring Record)	Completion Requirement
	Effective control methods may include physical/mechanical removal, bio control, cultural control, or chemical treatments;	, , ,	·		,	·	,	
	 Use of "permanent" soil sterilants to control weeds or other pests is prohibited because this would interfere with reclamation; 							
	 Notify the Agricultural Commissioner's office immediately regarding any suspected exotic/invasive pest species as defined by the California Department of Food Agriculture and the U.S. Department of Agriculture. Request a sample be taken by the Agricultural Commissioner's Office of a suspected invasive species. Eradication of exotic pests shall be done under the direction of the Agricultural Commissioner's Office and/or California Department of Food and Agriculture; 							
	 Obey all pesticide use laws, regulations, and permit conditions; 							
	 Allow access by Agricultural Commissioner staff for routine visual and trap pest surveys, compliance inspections, eradication of exotic pests, and other official duties; 							
	 Ensure all project employees that handle pest control issues are appropriately trained and certified, all required records are maintained and made available for inspection, and all required permits and other required legal documents are current; 							
	 Maintain records of pests found and treatments or pest management methods used. Records should include the date, location/block, project name (current and previous if changed), and methods used. For pesticides include the chemical(s) used, EPA Registration numbers, application rates, etc. A pesticide use report may be used for this; 							
	 Submit a report of monitoring, pest finds, and treatments, or other pest management methods to the Agricultural Commissioner quarterly within 15 days after the end of the previous quarter, and upon request. The report is required even if no pests were found 							

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Table 0.4-1. Mitigation Measures

Table 0.4-1. N	litigation Measures							
MM No.	Mitigation Measure	Monitoring Method	Responsible Monitoring Party	Monitoring Phase	Verification/Approval Party	Date Mitigation Measure Verified or Implemented	Location of Documents (Monitoring Record)	Completion Requirement
	or treatment occurred. It may consist of a copy of all records for the previous quarter, or may be a summary letter/report as long as the original detailed records are available upon request.							
	 A long-term strategy for weed and pest control and management during the operation of the proposed projects. Such strategies may include, but are not limited to: 							
	 Use of specific types of herbicides and pesticides on a scheduled basis. 							
	 Maintenance and management of project site conditions to reduce the potential for a significant increase in pest-related nuisance conditions on surrounding agricultural lands. 							
	5. The project shall reimburse the Agricultural Commissioner's office for the actual cost of investigations, inspections, or other required non-routine responses to the site that are not funded by other sources.							
Air Quality								
Applicant Proposed Measure (APM) AQ-1	Fugitive Dust Control. Pursuant to ICAPCD, all construction sites, regardless of size, must comply with the requirements contained within Regulation VIII – Fugitive Dust Control Measures. Whereas these Regulation VIII measures are mandatory and are not considered project environmental mitigation measures, the ICAPCD CEQA Handbook's required additional standard and enhanced mitigation measures listed below shall be implemented prior to and during construction. ICAPCD will verify implementation and compliance with these measures as part of the grading permit review/approval process.	Prior to and during construction, the ICAPCD will verify that the project is in compliance with Regulation VIII-Fugitive Dust Control Measures.	Department of Planning and Development Services and ICAPCD	Prior to and during construction	Department of Planning and Development Services and ICAPCD			
	ICAPCD Standard Measures for Fugitive Dust (PM ₁₀) Control							
	 All disturbed areas, including bulk material storage, which is not being actively utilized, shall be effectively stabilized and visible emissions shall be limited to no greater than 20 percent opacity for dust emissions by using water, chemical stabilizers, dust suppressants, tarps, or other suitable material, such as vegetative ground cover. 							

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Table 0.4-1. Mitigation Measures

Table 0.4-1.	Mitigation Measures							
MM No.	Mitigation Measure	Monitoring Method	Responsible Monitoring Party	Monitoring Phase	Verification/Approval Party	Date Mitigation Measure Verified or Implemented	Location of Documents (Monitoring Record)	Completion Requirement
	All on-site and offsite unpaved roads will be effectively stabilized and visible emissions shall be limited to no greater than 20 percent opacity for dust emissions by paving, chemical stabilizers, dust suppressants, and/or watering.							
	 All unpaved traffic areas 1 acre or more with 75 or more average vehicle trips per day will be effectively stabilized and visible emissions shall be limited to no greater than 20 percent opacity for dust emissions by paving, chemical stabilizers, dust suppressants, and/or watering. 							
	The transport of bulk materials shall be completely covered unless 6 inches of freeboard space from the top of the container is maintained with no spillage and loss of bulk material. In addition, the cargo compartment of all haul trucks is to be cleaned and/or washed at delivery site after removal of bulk material.							
	All track-out or carry-out will be cleaned at the end of each workday or immediately when mud or dirt extends a cumulative distance of 50 linear feet or more onto a paved road within an urban area.							
	Movement of bulk material handling or transfer shall be stabilized prior to handling or at points of transfer with application of sufficient water, chemical stabilizers, or by sheltering or enclosing the operation and transfer line.							
	The construction of any new unpaved road is prohibited within any area with a population of 500 or more unless the road meets the definition of a temporary unpaved road. Any temporary unpaved road shall be effectively stabilized and visible emissions shall be limited to no greater than 20 percent opacity for dust emission by paving, chemical stabilizers, dust suppressants, and/or watering.							
	Standard Mitigation Measures for Construction Combustion Equipment							
	Use of alternative fueled or catalyst equipped diesel construction equipment, including all off-road and portable diesel-powered equipment.							

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Table 0.4-1. Mitigation Measures

Table 0.4-1. Mitigation Measures Date Mitigation										
MM No.	Mitigation Measure	Monitoring Method	Responsible Monitoring Party	Monitoring Phase	Verification/Approval Party	Measure Verified or Implemented	Location of Documents (Monitoring Record)	Completion Requirement		
mivi No.	 Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes as a maximum. Limit, to the extent feasible, the hours of operation of heavy-duty equipment and/or the amount of equipment in use. When commercially available, replace fossil fueled equipment with electrically driven equivalents (provided they are not run via a portable generator set). 	Monitoring Method	Responsible Monitoring Party	Monitoring Phase	raity	mplementeu	(Monitoring Necord)	Keyunement		
APM AQ-2	Construction Equipment. Construction equipment shall be equipped with an engine designation of EPA Tier 2 or better (Tier 2+). A list of the construction equipment, including all off-road equipment utilized at each of the projects by make, model, year, horsepower and expected/actual hours of use, and the associated EPA Tier shall be submitted to the County Planning and Development Services Department and ICAPCD prior to the issuance of a grading permit. The equipment list shall be submitted periodically to ICAPCD to perform a NOx analysis. ICAPCD shall utilize this list to calculate air emissions to verify that equipment use does not exceed significance thresholds. The Planning and Development Services Department and ICAPCD shall verify implementation of this measure.	Prior to the issuance of a grading permit, ICAPCD shall verify that construction equipment is equipped with an engine designation of EPA Tier 2 or better. The equipment list shall be submitted periodically to ICAPCD to perform a NOx analysis.	Department of Planning and Development Services and ICAPCD	Prior to the issuance of a grading permit and during construction	Department of Planning and Development Services and ICAPCD					
APM AQ-3	Speed Limit. During construction and operation of the proposed project, the applicant shall limit the speed of all vehicles operating onsite on dirt roads to 15 miles per hour or less.	During construction and operation, the project applicant shall ensure the speed limit of all vehicles operating onsite on dirt roads is limited to 15 miles per hour or less. Department of Planning and Development Services shall field verify as necessary.	Department of Planning and Development Services	During construction and operation	Department of Planning and Development Services					
APM AQ-4	Dust Suppression. The project applicant shall employ a method of dust suppression (such as water or chemical stabilization) approved by ICAPCD. The project applicant shall apply chemical stabilization as directed by the product manufacturer to control dust between the panels as approved by ICAPCD, and other non-used areas (exceptions will be the paved entrance and parking area, and Fire Department	During construction, the Department of Planning and Development Services shall verify that the project applicant is employing a method of dust suppression approved by ICAPCD.	Department of Planning and Development Services	During construction	Department of Planning and Development Services					

County of Imperial

Table 0.4-1. Mitigation Measures

Table 0.4-1. Mitigation Measures										
MM No.	Mitigation Measure	Monitoring Method	Responsible Monitoring Party	Monitoring Phase	Verification/Approval Party	Date Mitigation Measure Verified or Implemented	Location of Documents (Monitoring Record)	Completion Requirement		
	access/emergency entry/exit points as approved by Fire/ Office of Emergency Services [OES] Department).									
APM AQ-5	Dust Suppression Management Plan. Prior to any earthmoving activity, the applicant shall submit a construction dust control plan and obtain ICAPCD and Development Services Department (ICPDS) approval.	Prior to any earthmoving activity, the ICAPCD and Department of Planning and Development Services shall review and approve a construction Dust Control Plan.	ICAPCD and Department of Planning and Development Services	Prior to construction	Department of Planning and Development Services and ICAPCD					
APM AQ-6	Operational Dust Control Plan. Prior to issuance of a Certificate of Occupancy, the applicant shall submit an operations dust control plan and obtain ICAPCD and ICPDS approval. ICAPCD Rule 301 Operational Fees apply to any project applying for a building permit. At the time that building permits are submitted for the proposed project, the ICAPCD shall review the project to determine if Rule 310 fees are applicable to the project.	Prior to the issuance of a Certificate of Occupancy, the applicant shall submit an operations dust control plan and obtain ICAPCD and ICPDS approval.	Department of Planning and Development Services	Prior to the issuance of a Certificate of Occupancy	Department of Planning and Development Services and ICAPCD					
Biological Resources										
BIO-1	 General Impact Avoidance and Minimization Measures. The following measures will be applicable throughout the life of the project: To reduce the potential indirect impact on migratory birds, bats and raptors, the project will comply with the APLIC 2012 Guidelines for overhead utilities, as appropriate, to minimize avian collisions with transmission facilities (APLIC 2012). All electrical components on the project site shall be either undergrounded or protected so that there will be no exposure to wildlife and therefore no potential for electrocution. The project proponent shall designate a Project Biologist who shall be responsible for overseeing compliance with protective measures for the biological resources during vegetation clearing and work activities within and adjacent to areas of native habitat. The Project Biologist will be familiar with the local habitats, plants, and wildlife. The Project Biologist will also maintain communications with the Contractor to ensure 	The measures as provided in Mitigation Measure BIO-1 shall be implemented throughout the life of the project.	Department of Planning and Development Services	Prior to construction, during construction, and post-construction	Department of Planning and Development Services					

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Table 0.4-1. Mitigation Measures

Table 0.4-1.	Mitigation Measures							
MM No.	Mitigation Measure	Monitoring Method	Responsible Monitoring Party	Monitoring Phase	Verification/Approval Party	Date Mitigation Measure Verified or Implemented	Location of Documents (Monitoring Record)	Completion Requirement
	that issues relating to biological resources are appropriately and lawfully managed and monitor construction. The Project Biologist will monitor activities within construction areas during critical times, such as vegetation removal, the implementation of Best Management Practices (BMP), and installation of security fencing to protect native species. The Project Biologist will ensure that all wildlife and regulatory agency permit requirements, conservation measures, and general avoidance and minimization measures are properly implemented and followed. • The boundaries of all areas to be newly disturbed (including solar facility areas, staging areas, access roads, and sites for temporary placement of construction materials and spoils) will be delineated with stakes and flagging prior to disturbance. All disturbances, vehicles, and equipment will be confined to the flagged areas. • No potential wildlife entrapments (e.g., trenches, bores) will be left uncovered overnight. Any uncovered pitfalls will be excavated to 3:1 slopes at the ends to provide wildlife escape ramps. Alternatively, man-made ramps may be installed. Covered pitfalls will be covered completely to prevent access by small mammals or reptiles. • To avoid wildlife entrapment (including birds), all pipes or other construction materials or supplies will be covered or capped in storage or laydown area, and at the end of each work day in construction, quarrying and processing/handling areas. No pipes or tubing of sizes or inside diameters ranging from 1 to 10 inches will be left open either temporarily or permanently. • No anticoagulant rodenticides, such as Warfarin and related compounds (indandiones and hydroxycoumarins), may be used within the project site, on off-site project facilities and activities, or in support of any other project activities.							
	Avoid wildlife attractants. All trash and food-related waste shall be placed in self-closing containers and removed regularly from the site to prevent overflow. Workers shall not feed wildlife.							

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Table 0.4-1. Mitigation Measures

Table 0.4-1.	Mitigation Measures					Date Mitigation		
MM No.	Mitigation Measure	Monitoring Method	Responsible Monitoring Party	Monitoring Phase	Verification/Approval	Measure Verified or	Location of Documents	Completion
MINI NO.	Water applied to dirt roads and construction areas for dust abatement shall use the minimal amount needed to meet safety and air quality standards to prevent the formation of puddles, which could attract wildlife. Pooled rainwater or floodwater within retention basins will be removed to avoid attracting wildlife to the active work areas.	Monitoring Method	Responsible Monitoring Party	Monitoring Phase	Party	Implemented	(Monitoring Record)	Requirement
	To minimize the likelihood for vehicle strikes on wildlife, speed limits will not exceed 15 miles per hour when driving on access roads. All vehicles required for O&M must remain on designated access/maintenance roads.							
	 Avoid night-time construction lighting or if nighttime construction cannot be avoided use shielded directional lighting pointed downward and towards the interior of the project site, thereby avoiding illumination of adjacent natural areas and the night sky. 							
	 All construction equipment used for the project will be equipped with properly operating and maintained mufflers. 							
	Hazardous materials and equipment stored overnight, including small amounts of fuel to refuel hand-held equipment, will be stored within secondary containment when within 50 feet of open water to the fullest extent practicable. Secondary containment will consist of a ring of sand bags around each piece of stored equipment/structure. A plastic tarp/visqueen lining with no seams shall be placed under the equipment and over the edges of the sandbags, or a plastic hazardous materials secondary containment unit shall be utilized by the Contractor.							
	The Contractor will be required to conduct vehicle refueling in upland areas where fuel cannot enter waters of the U.S. and in areas that do not have potential to support federally threatened or endangered species. Any fuel containers, repair materials, including creosote-treated wood, and/or stockpiled material that is left on site overnight, will be secured in secondary containment within the work area and staging/assembly area and covered with plastic at the end of each work day.							

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Table 0.4-1. Mitigation Measures

14310 011 11	Militigation Measures					Date Mitigation Measure	Location of	
MM No.	Mitigation Measure	Monitoring Method	Responsible Monitoring Party	Monitoring Phase	Verification/Approval Party	Verified or Implemented	Documents (Monitoring Record)	Completion Requirement
	 In the event that no activity is to occur in the work area for the weekend and/or a period of time greater than 48 hours, the Contractor will ensure that all portable fuel containers are removed from the project site. 							
	 All equipment will be maintained in accordance with manufacturer's recommendations and requirements. 							
	Equipment and containers will be inspected daily for leaks. Should a leak occur, contaminated soils and surfaces will be cleaned up and disposed of following the guidelines identified in the Stormwater Pollution Prevention Plan or equivalent, Materials Safety Data Sheets, and any specifications required by other permits issued for the project.							
	The Contractor will utilize off-site maintenance and repair shops as much as possible for maintenance and repair of equipment.							
	If maintenance of equipment must occur onsite, fuel/oil pans, absorbent pads, or appropriate containment will be used to capture spills/leaks within all areas. Where feasible, maintenance of equipment will occur in upland areas where fuel cannot enter waters of the U.S. and in areas that do not have potential to support federally threatened or endangered species.							
	• Appropriate BMPs will be used by the Contractor to control erosion and sedimentation and to capture debris and contaminants from bridge construction to prevent their deposition in waterways. No sediment or debris will be allowed to enter the creek or other drainages. All debris from construction of the bridge will be contained so that it does not fall into channel. Appropriate BMPs will be used by the Contractor during construction to limit the spread of resuspended sediment and to contain debris.							
	 Erosion and sediment control devices used for the proposed project, including fiber rolls and bonded fiber matrix, will be made from biodegradable materials such as jute, with no plastic mesh, to avoid creating a wildlife entanglement hazard. 							

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Table 0.4-1. Mitigation Measures

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MM No.	Mitigation Measure	Monitoring Method	Responsible Monitoring Party	Monitoring Phase	Verification/Approval Party	Date Mitigation Measure Verified or Implemented	Location of Documents (Monitoring Record)	Completion Requirement
	 Firearms, open fires, and pets would be prohibited at all work locations and access roads. Smoking would be prohibited along the project alignment. Cross-country vehicle and equipment use outside of approved designated work areas and access roads shall be prohibited to prevent unnecessary ground and vegetation disturbance. Any injured or dead wildlife encountered during project-related activities shall be reported to the project biologist, biological monitor, CDFW, or a CDFW-approved veterinary facility as soon as possible to report the observation and determine the best course of action. For special-status species, the Project Biologist shall notify the County, USFWS, and/or CDFW, as appropriate, within 24 hours of the discovery. Stockpiling of material will be allowed only within established work areas. Actively manage the spread of noxious weeds The ground beneath all parked equipment and vehicles shall be inspected for wildlife before moving. 							
BIO-2	Worker Environmental Awareness Program. Prior to project construction, a Worker Environmental Awareness Program shall be developed and implemented by a qualified biologist, and shall be available in both English and Spanish. Handouts summarizing potential impacts to special-status biological resources and the potential penalties for impacts to these resources shall be provided to all construction personnel. At a minimum, the education program shall include the following: • the purpose for resource protection; • a description of special status species including representative photographs and general ecology; • occurrences of USACE, RWQCB, and CDFW regulated features in the project survey area; • regulatory framework for biological resource protection and consequences if violated; • sensitivity of the species to human activities;	Prior to construction, the Department of Planning and Development Services shall verify that a Worker Environmental Awareness Program has been implemented by a qualified biologist. The Department of Planning and Development Services shall verify the completion of the Worker Environmental Awareness Program by obtaining signed acknowledgements forms from workers.	Department of Planning and Development Services	Prior to construction	Department of Planning and Development Services			

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Table 0.4-1. Mitigation Measures

14510 0.4-1.	Mitigation Measures					Date Mitigation		
MM No.	Mitigation Measure	Monitoring Method	Responsible Monitoring Party	Monitoring Phase	Verification/Approval Party	Measure Verified or Implemented	Location of Documents (Monitoring Record)	Completion Requirement
	 avoidance and minimization measures designed to reduce the impacts to special-status biological resources; environmentally responsible construction practices; reporting requirements; the protocol to resolve conflicts that may arise at any time during the construction process; and workers sign acknowledgement form indicating that the Environmental Awareness Training and Education Program that has been completed and would be kept on record. 							
BIO-3	Burrowing Owl Avoidance and Minimization. Take Avoidance (pre-construction) surveys for burrowing owl shall be completed prior to project construction. Surveys shall be conducted as detailed within Appendix D of the Staff Report on Burrowing Owl Mitigation (California Department of Fish and Game [CDFG] 2012). If burrowing owl is not detected, construction may proceed. • If burrowing owl is identified during the non-breeding season (September 1 through January 31), then a 50-meter buffer will be established by the biological monitor. Construction within the buffer will be avoided until a qualified biologist determines that burrowing owl is no longer present or until a CDFW-approved exclusion plan has been implemented. The buffer distance may be reduced if noise attenuation buffers such as hay bales are placed between the occupied burrow and construction activities. • If burrowing owl is identified during the breeding season (February 1 through August 31), then an appropriate buffer will be established by the biological monitor in accordance with the Staff Report on Burrowing Owl Mitigation (CDFG)	Prior to construction, the Department of Planning and Development Services shall verify that pre-construction surveys for burrowing owl were conducted. If burrowing owls are present, the measures as listed in Mitigation Measure BIO-3 shall be implemented.	Department of Planning and Development Services	Prior to construction, during construction	Department of Planning and Development Services			
	2012). Construction within the buffer will be avoided until a qualified biologist determines that burrowing owl is no longer present or until young have fledged. The buffer distance may be reduced in consultation with CDFW if noise attenuation buffers such as hay bales are placed							

County of Imperial

Table 0.4-1. Mitigation Measures

Table 0.4-1.1	Mitigation Measures							
					N	Date Mitigation Measure	Location of	O a manufactions
MM No.	Mitigation Measure	Monitoring Method	Responsible Monitoring Party	Monitoring Phase	Verification/Approval Party	Verified or Implemented	Documents (Monitoring Record)	Completion Requirement
	between the occupied burrow and construction activities.							
BIO-4	Pre-Construction Nesting Bird Surveys. If construction or other project activities are scheduled to occur during the bird breeding season (typically February 1 through August 31 for raptors and March 15 through August 31 for the majority of migratory bird species), a pre-construction nesting-bird survey shall be conducted by a qualified avian biologist to ensure that active bird nests, including those for the loggerhead shrike and mountain plover will not be disturbed or destroyed. The survey shall be completed no more than three days prior to initial ground disturbance. The nesting-bird survey shall include the project site and adjacent areas where project activities have the potential to affect active nests, either directly or indirectly due to construction activity or noise. If an active nest is identified, the biologist shall establish an appropriately sized disturbance-limit buffer around the nest using flagging or staking. Construction activities shall not occur within any disturbance-limit buffer zones until the nest is deemed inactive by the qualified biologist. If construction activities cease for a period of greater than three days during the bird breeding season, a pre-construction nesting bird survey shall be conducted prior to the commencement of activities. Final construction buffers or setback distances shall be determined by the qualified biologist in coordination with USFWS and CDFW on a case-by-case basis, depending on the species, season in which disturbance shall occur, the type of disturbance, and other factors that could influence susceptibility to disturbance levels, etc.).	Prior to construction, the Department of Planning and Development Services shall verify that a pre-construction nesting bird survey was conducted if project activities are scheduled during the bird breeding season (typically February 1 through August 31 for raptors and March 15 through August 31 for the majority of migratory bird species). If nesting birds are present, the measures as listed in Mitigation Measure BIO-4 shall be implemented.	Department of Planning and Development Services	Prior to construction, during construction	Department of Planning and Development Services			
Cultural Resour	rces							
CUL-1	Cultural Monitoring. Prior to construction, the project Applicant shall retain the services of a Qualified Professional Archaeologist meeting the Secretary of the Interior's Standards for a Qualified Archaeologist and require that all initial ground-disturbing work be monitored by someone trained in artifact and feature identification in monitoring contexts. A Supervising Archaeological Specialist and a Paleontological Monitor, to be retained by the project applicant, will be	Prior to construction, the Department of Planning and Development Services shall verify that the project applicant has retained a qualified professional archaeologist and paleontological monitor.	Department of Planning and Development Services	Prior to construction, during all initial ground disturbance	Department of Planning and Development Services			

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Table 0.4-1. Mitigation Measures

1 abic 0.4-1. IV	Table 0.4-1. Mitigation Measures										
MM No.	Mitigation Measure	Monitoring Method	Responsible Monitoring Party	Monitoring Phase	Verification/Approval Party	Date Mitigation Measure Verified or Implemented	Location of Documents (Monitoring Record)	Completion Requirement			
	required to be present at the project construction phase kickoff meeting.										
CUL-2	Worker Environmental Awareness Program. Prior to any ground disturbance, the supervising Archaeological Resources Specialist and Archaeological Resources Monitor shall conduct initial Worker Environmental Awareness Program (WEAP) training to all construction personnel, including supervisors, present at the outset of the project construction work phase, for which the Lead Contractor and all subcontractors shall make their personnel available. This WEAP training will educate construction personnel on how to work with the monitor(s) to identify and minimize impacts to paleontological resources and maintain environmental compliance and be performed periodically for new personnel coming on to the project as needed.	Prior to grading, the Department of Planning and Development Services shall verify that a Worker Environmental Awareness Program has been implemented by an Archaeological Resources Specialist and Archaeological Resources Monitor. The Department of Planning and Development Services shall verify the completion of the Worker Environmental Awareness Program by obtaining signed acknowledgements forms from workers.	Department of Planning and Development Services	Prior to grading	Department of Planning and Development Services						
CUL-3	Discovery of Previously Unidentified Archaeological Materials. In the event of the discovery of previously unidentified archaeological materials, the construction contractor shall immediately cease all work activities within approximately 100 feet of the discovery. After cessation of excavation, the construction contractor shall immediately contact the Imperial County Department of Planning and Development Services. Except in the case of cultural items that fall within the scope of the Native American Grave Protection and Repatriation Act, the discovery of any cultural resource within the project area shall not be grounds for a "stop work" notice or otherwise interfere with the project's continuation except as set forth in this paragraph. In the event of an unanticipated discovery of archaeological materials during construction, the project Applicant shall retain the services of a Qualified Professional Archaeologist meeting the Secretary of the Interior's Standards for a Qualified Archaeologist to evaluate the significance of the materials prior to resuming any construction-related activities in the vicinity of the find. If the Qualified Archaeologist determines that the discovery constitutes a significant resource under CEQA and it	The construction contractor shall notify the County immediately if unknown archaeological resources are encountered. The applicant shall retain the services of a qualified professional archaeologist in the event of an unanticipated discovery.	Department of Planning and Development Services	During grading and construction	Department of Planning and Development Services						

County of Imperial

Table 0.4-1. Mitigation Measures

Table 0.4-1.	Table 0.4-1. Mitigation Measures								
MM No.	Mitigation Measure	Monitoring Method	Responsible Monitoring Party	Monitoring Phase	Verification/Approval Party	Date Mitigation Measure Verified or Implemented	Location of Documents (Monitoring Record)	Completion Requirement	
	cannot be avoided, the project Applicant shall implement an archaeological data recovery program.								
CUL-4	Schedule of Ground-Disturbing Activities. The construction contractor shall provide the Supervising Archaeological Resources Specialist with a schedule of initial potential ground-disturbing activities. A minimum of 48 hours will be provided of commencement of any initial ground-disturbing activities such as vegetation grubbing or clearing, grading, trenching, or mass excavation. As detailed in the schedule provided, an Archaeological Monitor shall be present on site at the commencement of ground-disturbing activities related to the project. The monitor, in consultation with the Supervising Archaeologist, shall observe initial ground-disturbing activities and, as they proceed, make adjustments to the number of monitors as needed to provide adequate observation and oversight. All monitors will have stop-work authority to allow for recordation and evaluation of finds during construction. The monitor will maintain a daily record of observations to serve as an ongoing reference resource and to provide a resource for final reporting upon completion of the project. The Supervising Archaeologist, Archaeological Monitor, and the lead contractor and subcontractors shall maintain a line of communication regarding schedule and activity such that the monitor is aware of all ground-disturbing activities in advance in order to provide appropriate oversight.	Prior to grading, the construction contractor shall provide the Department of Planning and Development Services and Supervising Archaeological Resources Specialist a copy of the schedule of ground-disturbing activities.	Department of Planning and Development Services	Prior to grading	Department of Planning and Development Services				
CUL-5	Discovery of Archaeological Resources. If archaeological resources are discovered, construction shall be halted within 50 feet of the find and shall not resume until a Qualified Archaeologist can determine the significance of the find and/or the find has been fully investigated, documented, and cleared.	During grading and construction, discovery of archaeological resources shall result in work stoppage in that area until the Qualified Archaeologist can determine the significance of the find. The applicant shall notify the County within 24 hours if archaeological resources are encountered.	Department of Planning and Development Services	During grading and construction	Department of Planning and Development Services				

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Table 0.4-1. Mitigation Measures

MM No.	Mitigation Measure	Monitoring Method	Responsible Monitoring Party	Monitoring Phase	Verification/Approval Party	Date Mitigation Measure Verified or Implemented	Location of Documents (Monitoring Record)	Completion Requirement
CUL-6	Archaeological Resources Monitoring Report. At the completion of all ground-disturbing activities, the Consultant shall prepare an Archaeological Resources Monitoring Report summarizing all monitoring efforts and observations, as performed, and any and all prehistoric or historic archaeological finds as well as providing follow-up reports of any finds to the South Coastal Information Center (SCIC), as required.	At the completion of ground disturbance, the Consultant shall prepare and submit a copy of the Archaeological Resources Monitoring Report to the Department of Planning and Development Services.	Department of Planning and Development Services	Post ground- disturbing activities	Department of Planning and Development Services			
CUL-7	Discovery of Human Remains. In the unlikely event that human remains are discovered during ground-disturbing activities, then the proposed project would be subject to California Health and Safety Code 7050.5, CEQA Section 15064.5, and California Public Resources Code Section 5097.98 (NPS 1983). If human remains are found during ground-disturbing activities, State of California Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the Imperial County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. In the event of an unanticipated discovery of human remains, the Imperial County Coroner shall be notified immediately. If the human remains are determined to be prehistoric, the County Coroner shall notify the NAHC, which shall notify a most likely descendant (MLD). The MLD shall complete the inspection of the site within 48 hours of notification and may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.	During grading and construction, discovery of human remains shall result in work stoppage in that area until the coroner and the Native American Heritage Commission are contacted.	Department of Planning and Development Services	During grading and construction	Department of Planning and Development Services			

County of Imperial

Table 0.4-1. Mitigation Measures

Table 0.4-1.	Mitigation Measures							
MM No.	Mitigation Measure	Monitoring Method	Responsible Monitoring Party	Monitoring Phase	Verification/Approval Party	Date Mitigation Measure Verified or Implemented	Location of Documents (Monitoring Record)	Completion Requirement
Geology and S	coils							
GEO-1	Prepare Geotechnical Report(s) as Part of Final Engineering for the Project and Implement Required Measures. Facility design for all project components shall comply with the site-specific design recommendations as provided by a licensed geotechnical or civil engineer to be retained by the project applicant. The final geotechnical and/or civil engineering report shall address and make recommendations on the following:	Prior to the issuance of a grading permit, the Imperial County Public Works Department, Engineering Division shall review and approve a Final Geotechnical Report and/or Civil Engineering Report.	Department of Planning and Development Services and Imperial County Public Works Department, Engineering Division	Prior to issuance of a grading permit	Department of Planning and Development Services and Imperial County Public Works Department, Engineering Division			
	Site preparation							
	Soil bearing capacity							
	Appropriate sources and types of fill							
	Potential need for soil amendments							
	Structural foundations							
	Grading practices							
	Soil corrosion of concrete and steel							
	Erosion/winterization							
	Seismic ground shaking							
	Liquefaction							
	Expansive/unstable soils							
	In addition to the recommendations for the conditions listed above, the geotechnical investigation shall include subsurface testing of soil and groundwater conditions, and shall determine appropriate foundation designs that are consistent with the version of the CBC that is applicable at the time building and grading permits are applied for. All recommendations contained in the final geotechnical engineering report shall be implemented by the project applicant. The final geotechnical and/or civil engineering report shall be submitted to Imperial County Public Works Department, Engineering Division for review and approval prior to issuance of building permits.							

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Table 0.4-1. Mitigation Measures

Table 0.4-	. Mitigation Measures							
MM No.	Mitigation Measure	Monitoring Method	Responsible Monitoring Party	Monitoring Phase	Verification/Approval Party	Date Mitigation Measure Verified or Implemented	Location of Documents (Monitoring Record)	Completion Requirement
GEO-2	Paleontological Mitigation and Monitoring Plan. Once a geotechnical report has been completed for the project, a qualified paleontologist shall review the boring logs and determine how deep paleontologically sensitive formations may be across the project site. The paleontologist shall use this information along with the results of the paleontological survey to determine if paleontological monitoring is warranted. If monitoring is warranted, a qualified paleontologist shall prepare a mitigation and monitoring plan to be implemented during project construction.	If paleontological monitoring is warranted, a mitigation and monitoring report shall be prepared and submitted to the Department of Planning and Development Services for review and approval.	Department of Planning and Development Services	Prior to grading	Department of Planning and Development Services			
GEO-3	Paleontological Monitoring. Prior to construction, the project applicant shall retain the services of a Qualified Paleontologist and require that all initial ground-disturbing work be monitored by someone trained in fossil identification in monitoring contexts. A Supervising Paleontological Specialist and a Paleontological Monitor, to be retained by the project applicant, will be required to be present at the project construction phase kickoff meeting.	Prior to grading, the applicant shall retain the services of a qualified paleontologist.	Department of Planning and Development Services	Prior to grading	Department of Planning and Development Services			
GEO-4	Worker Environmental Awareness Program. Prior to any ground disturbance, the Supervising Paleontological Resources Specialist and Paleontological Resources Monitor shall conduct initial Worker Environmental Awareness Program (WEAP) training to all construction personnel, including supervisors, present at the outset of the project construction work phase, for which the Lead Contractor and all subcontractors shall make their personnel available. This WEAP training will educate construction personnel on how to work with the monitor(s) to identify and minimize impacts to paleontological resources and maintain environmental compliance and be performed periodically for new personnel coming on to the project as needed.	Prior to grading, the Department of Planning and Development Services shall verify that a Worker Environmental Awareness Program has been implemented by Paleontological Resources Specialist and Paleontological Resources Monitor. The Department of Planning and Development Services shall verify the completion of the Worker Environmental Awareness Program by obtaining signed acknowledgements forms from workers.	Department of Planning and Development Services	Prior to grading	Department of Planning and Development Services			

County of Imperial

Table 0.4-1. Mitigation Measures

Table 0.4-1. Mitigation Measures									
MM No.	Mitigation Measure	Monitoring Method	Responsible Monitoring Party	Monitoring Phase	Verification/Approval Party	Date Mitigation Measure Verified or Implemented	Location of Documents (Monitoring Record)	Completion Requirement	
GEO-5	Schedule of Ground-Disturbing Activities. During construction, the construction contractor shall provide the Supervising Paleontological Resources Specialist with a schedule of initial potential ground-disturbing activities. A minimum of 48 hours will be provided of commencement of any initial ground-disturbing activities such as vegetation grubbing or clearing, grading, trenching, or mass excavation. As detailed in the schedule provided, a Paleontological Monitor shall be present on site at the commencement of ground-disturbing activities related to the project. The monitor, in consultation with the Supervising Paleontologist, shall observe initial ground-disturbing activities and, as they proceed, make adjustments to the number of monitors as needed to provide adequate observation and oversight. All monitors will have stop-work authority to allow for recordation and evaluation of finds during construction. The monitor will maintain a daily record of observations to serve as an ongoing reference resource and to provide a resource for final reporting upon completion of the project. The Supervising Paleontologist, Paleontological Monitor, and the Lead Contractor and subcontractors shall maintain a line of communication regarding schedule and activity such that the monitor is aware of all ground-disturbing activities in advance in order to provide appropriate oversight.	Prior to grading, the construction contractor shall provide the Department of Planning and Development Services and Supervising Paleontological Resources Specialist a copy of the schedule of ground-disturbing activities.	Department of Planning and Development Services	Prior to grading	Department of Planning and Development Services				
GEO-6	Discovery of Paleontological Resources. During construction, if paleontological resources are discovered, construction shall be halted within 50 feet of any paleontological finds and shall not resume until a Qualified Paleontologist can determine the significance of the find and/or the find has been fully investigated, documented, and cleared.		Department of Planning and Development Services	During grading and construction	Department of Planning and Development Services				

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Table 0.4-1. Mitigation Measures

Table 0.4-1.	Mitigation Measures							
MM No.	Mitigation Measure	Monitoring Method	Responsible Monitoring Party	Monitoring Phase	Verification/Approval Party	Date Mitigation Measure Verified or Implemented	Location of Documents (Monitoring Record)	Completion Requirement
GEO-7	Paleontological Resources Monitoring Report. At the completion of all ground-disturbing activities, the Supervising Paleontological Specialist shall prepare a Paleontological Resources Monitoring Report summarizing all monitoring efforts and observations, as performed, and any and all paleontological finds.	The project applicant shall submit a copy of the Paleontological Resources Monitoring Report to the Department of Planning and Development Services.	Department of Planning and Development Services	Post ground- disturbing activities	Department of Planning and Development Services			
Hydrology/Wa	ter Quality							
HYD-1	Prepare SWPPP and Implement BMPs Prior to Construction and Site Restoration. The project applicant or its contractor shall prepare a SWPPP specific to the project and be responsible for securing coverage under SWRCB's NPDES stormwater permit for general construction activity (Order 2009-0009-DWQ). The SWPPP shall identify specific actions and BMPs relating to the prevention of stormwater pollution from project-related construction sources by identifying a practical sequence for site restoration, BMP implementation, contingency measures, responsible parties, and agency contacts. The SWPPP shall reflect localized surface hydrological conditions and shall be reviewed and approved by the appropriate agency prior to commencement of work and shall be made conditions of the contract with the contractor selected to build and decommission the project. The SWPPP shall incorporate control measures in the following categories: Soil stabilization and erosion control practices (e.g., hydroseeding, erosion control blankets, mulching) Sediment control practices (e.g., temporary sediment basins, fiber rolls) Temporary and post-construction on- and off-site runoff controls Special considerations and BMPs for water crossings and drainages Monitoring protocols for discharge(s) and receiving waters, with emphasis place on the following water quality objectives: dissolved oxygen, floating material, oil and grease, potential of hydrogen (pH), and turbidity Waste management, handling, and disposal control practices	Prior to construction and site restoration, the project applicant or its contractor shall prepare a SWPPP with incorporated control measures as outlined in Mitigation Measure HYD-1; and implement BMPs. Department of Planning and Development Services to verify.	Department of Planning and Development Services	Prior to issuance of a grading permit and site restoration	Department of Planning and Development Services			

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Table 0.4-1. Mitigation Measures

Tubio oi i	Miligation Measures							
MM No.	Mitigation Measure	Monitoring Method	Responsible Monitoring Party	Monitoring Phase	Verification/Approval Party	Date Mitigation Measure Verified or Implemented	Location of Documents (Monitoring Record)	Completion Requirement
	Corrective action and spill contingency measures							
	Agency and responsible party contact information							
	 Training procedures that shall be used to ensure that workers are aware of permit requirements and proper installation methods for BMPs specified in the SWPPP 							
	The SWPPP shall be prepared by a Qualified SWPPP Practitioner and/or Qualified SWPPP Developer with BMPs selected to achieve maximum pollutant removal and that represent the best available technology that is economically achievable. Emphasis for BMPs shall be placed on controlling discharges of oxygen-depleting substances, floating material, oil and grease, acidic or caustic substances or compounds, and turbidity. BMPs for soil stabilization and erosion control practices and sediment control practices will also be required. Performance and effectiveness of these BMPs shall be determined either by visual means where applicable (i.e., observation of above-normal sediment release), or by actual water sampling in cases where verification of contaminant reduction or elimination, (inadvertent petroleum release) is required to determine adequacy of the measure.							
HYD-2	Incorporate Post-Construction Runoff BMPs into Project Drainage Plan. The project Drainage Plan shall adhere to the County's Engineering Guidelines Manual, IID "Draft" Hydrology Manual, or other recognized source with approval by the County Engineer to control and manage the on- and off-site discharge of stormwater to existing drainage systems. Infiltration basins will be integrated into the Drainage Plan to the maximum extent practical. The Drainage Plan shall provide both short- and long-term drainage solutions to ensure the proper sequencing of drainage facilities and management of runoff generated from project impervious surfaces as necessary.	Post construction, the applicant shall implement a Drainage Plan in accordance with the County and Imperial Irrigation District guidelines for the project site. Department of Planning and Development Services and IID to confirm.	Department of Planning and Development Services	Post construction	Department of Planning and Development Services and IID			

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Executive Summary

This environmental impact report (EIR) has been prepared in compliance with the California Environmental Quality Act (CEQA) Public Resources Code [PRC] Section 21000 et seq., the CEQA Guidelines (Section 15000 et seq.) as promulgated by the California Resources Agency and the Governor's Office of Planning and Research (OPR). The purpose of this environmental document is to assess the potential environmental effects associated with the Brawley Solar Energy Facility Project (i.e., "project" or "proposed project") and to propose mitigation measures, where required, to reduce significant impacts.

Project Overview

The project is located on five parcels, with Assessor Parcel Numbers 037-140-006, -020, -021, -022, and -023. The proposed solar energy facility consists of three primary components: 1) solar energy generation equipment and associated facilities including a substation and access roads (herein referred to as "solar energy facility"); 2) battery energy storage system; and, 3) gen-tie line that would connect the proposed on-site substation to the point of interconnection at the Imperial Irrigation District's (IID) existing North Brawley Geothermal Power Plant substation.

The proposed project involves the construction and operation of a 40 megawatt (MW) photovoltaic (PV) solar energy facility on approximately 227 acres of privately-owned land in unincorporated Imperial County. The proposed project would be comprised of bifacial solar PV arrays panels, an onsite, 92/12 kilovolt (kV) substation, 40 MW battery storage system (BESS), generation tie-line (gentie), fiberoptic line and or microwave tower, inverters, transformers, underground electrical cables, and access roads.

The onsite substation control room would house the Supervisory Control and Data Acquisition (SCADA) system, switchgear, breakers, and direct current (DC) batteries. Additionally, a 20kV emergency backup generator would be located adjacent to this control room for the HVAC system. The proposed substation site would be located at the southern edge of the project site, adjacent to the BESS. The proposed project would connect to a switchyard located at the southern edge of the project site and then routed through the BESS for energy storage. The power produced by the proposed project would then be transferred via a 1.8-mile-long double circuit 13.8 and 92 kV gen-tie line with 66-foot-high poles to interconnect to the IID' existing North Brawley Geothermal Power Plant substation, located at Hovley Road and Andre Road, southwest of the project site. The transmission line would span the New River. A 12-inch diameter conduit railroad undercrossing would connect the PV arrays from the western side of the railroad tracks to the inverters on the eastern side.

The project applicant intends to secure a Power Purchase Agreement with utility service provider(s) for the sale of power from the project.

Purpose of an EIR

The purpose of an EIR is to analyze the potential environmental impacts associated with a project. CEQA (Section 15002) states that the purpose of CEQA is to: (1) inform the public and governmental decision makers of the potential significant environmental impacts of a project; (2) identify the ways that environmental damage can be avoided or significantly reduced; (3) prevent significant avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible; and (4) disclose to the public the reasons why a governmental agency approved the project in the manner the agency chose if significant environmental effects are involved.

Eliminated from Further Review in Notice of Preparation

The Initial Study (IS)/NOP completed by the County (Appendix A of this EIR) determined that environmental effects to Forestry Resources, Energy, Mineral Resources, Noise, Population/Housing, Public Services, Recreation, Utilities (Wastewater, Stormwater, and Solid Waste), and Wildfire would not be potentially significant. Therefore, these impacts are not addressed in this EIR; however, the rationale for eliminating these issues is discussed in Chapter 6.0, Effects Found Not Significant.

Summary of Significant Impacts and Mitigation Measures that Reduce or Avoid the Significant Impacts

Based on the analysis presented in the IS/NOP and the information provided in the comments to the IS/NOP, the following environmental topics are analyzed in this EIR:

- Aesthetics
- Agriculture Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Geology and Soils
- GHG Emissions
- Hazards and Hazardous Materials
- Hydrology/Water Quality
- Land Use/Planning
- Public Services (Fire Protection and Police Protection)
- Transportation
- Tribal Cultural Resources
- Utilities/Service Systems (Water Supply)

Table ES-1 summarizes existing environmental impacts that were determined to be potentially significant, mitigation measures, and level of significance after mitigation associated with the project.

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Areas of Controversy and Issues to be Resolved

Areas of Concern

Section 15123(b)(2) of the CEQA Guidelines requires that an EIR identify areas of controversy known to the Lead Agency, including issues raised by other agencies and the public as well as issues to be resolved. A primary issue associated with this solar farm project, and other solar facility projects that are proposed in the County, is the corresponding land use compatibility and fiscal/economic impacts to the County. Through the environmental review process for this project, other areas of concern and issues to be resolved include potential impacts related to the conversion of farmland to non-agricultural uses, damage to crops, wildlife, water supply, fire hazards associated with the battery energy storage system, health effects from air pollution, noise, <u>and</u> hazardous materials, <u>waste</u>, <u>electromagnetic exposure safety</u>, and change of visual character.

Detailed analyses of these topics are included within each corresponding section contained within this document.

Executive Summary Final EIR | Brawley Solar Energy Facility Project

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Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation		Proposed Mitigation Measures	Significance After Mitigation
Agricultural Resources				
Impact 3.3-1: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance	Potentially Significant	AG-1a	Payment of Agricultural and Other Benefit Fees. One of the following options included below is to be implemented prior to the issuance of a grading permit or building permit for the project:	Less than Significant
			Mitigation for Non-Prime Farmland	
			Option 1: Provide Agricultural Conservation Easement(s). The Permittee shall procure Agricultural Conservation Easements on a "1 on 1" basis on land of equal size, of equal quality farmland, outside the path of development. The conservation easement shall meet DOC regulations and shall be recorded prior to issuance of any grading or building permits; or	
			Option 2: Pay Agricultural In-Lieu Mitigation Fee. The Permittee shall pay an "Agricultural In-Lieu Mitigation Fee" in the amount of 20 percent of the fair market value per acre for the total acres of the proposed site based on five comparable sales of land used for agricultural purposes as of the effective date of the permit, including program costs on a cost recovery/time and material basis. The Agricultural In-Lieu Mitigation Fee, will be placed in a trust account administered by the Imperial County Agricultural Commissioner's office and will be used for such purposes as the acquisition, stewardship, preservation and enhancement of agricultural lands within Imperial County; or,	
			Option 3: Public Benefit Agreement. The Permittee and County voluntarily enter into an enforceable Public Benefit Agreement or Development Agreement that includes an Agricultural Benefit Fee payment that is 1) consistent with Board Resolution 2012 005; 2) the Agricultural Benefit Fee must be held by the County in a restricted account to be used by the County only for such purposes as the stewardship, preservation and enhancement of agricultural lands within Imperial County	

Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation	Proposed Mitigation Measures	Significance After Mitigation
		and to implement the goals and objectives of the Agricultural Benefit program, as specified in the Development Agreement, including addressing the mitigation of agricultural job loss on the local economy.	
		Mitigation for Prime Farmland	
		Option 1: Provide Agricultural Conservation Easement(s). The Permittee shall procure Agricultural Conservation Easements on a "2 on 1" basis on land of equal size, of equal quality farmland, outside the path of development. The conservation easement shall meet DOC regulations and shall be recorded prior to issuance of any grading or building permits; or	
		Option 2: Pay Agricultural In-Lieu Mitigation Fee. The Permittee shall pay an "Agricultural In-Lieu Mitigation Fee" in the amount of 30 percent of the fair market value per acre for the total acres of the proposed site based on five comparable sales of land used for agricultural purposes as of the effective date of the permit, including program costs on a cost recovery/time and material basis. The Agricultural In-Lieu Mitigation Fee, will be placed in a trust account administered by the Imperial County Agricultural Commissioner's office and will be used for such purposes as the acquisition, stewardship, preservation and enhancement of agricultural lands within Imperial County; or,	
		Option 3: Public Benefit Agreement. The Permittee and County voluntarily enter into an enforceable Public Benefit Agreement or Development Agreement that includes an Agricultural Benefit Fee payment that is 1) consistent with Board Resolution 2012 005; 2) the Agricultural Benefit Fee must be held by the County in a restricted account to be used by the County only for such purposes as the stewardship, preservation and enhancement of agricultural lands within Imperial County and to implement the goals and objectives of the Agricultural Benefit program, as specified in the Development Agreement,	

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Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation		Proposed Mitigation Measures	Significance After Mitigation
			including addressing the mitigation of agricultural job loss on the local economy; the Project and other recipients of the Project's Agricultural Benefit Fee funds; or emphasis on creation of jobs in the agricultural sector of the local economy for the purpose of off-setting jobs displaced by this Project.	
			Option 4: Avoid Prime Farmland. The Permittee must revise their CUP Application/Site Plan to avoid Prime Farmland.	
		AG-1b	Site Reclamation Plan. The DOC has clarified the goal of a reclamation and decommissioning plan: the land must be restored to land which can be farmed. In addition to Mitigation Measure AG-1a for Prime Farmland and Non-Prime Farmland, the Applicant shall submit to Imperial County, a Reclamation Plan prior to issuance of a grading permit. The Reclamation Plan shall document the procedures by which the project site will be returned to its current agricultural condition. Permittee shall also provide financial assurance/bonding in the amount equal to a cost estimate prepared by a California licensed general contractor or civil engineer for implementation of the Reclamation Plan in the even Permittee fails to perform the Reclamation Plan.	
Impact 3.3-3: Conversion of Farmland, to non-agricultural	Potentially Significant	Implement	Mitigation Measure AG-1b.	Less than Significant
use		AG-2	Pest Management Plan. Prior to the issuance of a grading permit or building permit (whichever occurs first), a Pest Management Plan shall be developed by the project applicant and approved by the County of Imperial Agricultural Commissioner. The project applicant shall maintain a Pest Management Plan until reclamation is complete. The plan shall provide the following:	
			 Monitoring, preventative, and management strategies for weed and pest control during construction activities at any portion of the project (e.g., transmission line); 	

Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation	Proposed Mitigation Measures	Significance After Mitigation
		Control and management of weeds and pests in areas temporarily disturbed during construction where native seed will aid in site revegetation as follows:	
		 Monitor for all pests including insects, vertebrates, weeds, and pathogens. Promptly control or eradicate pests when found, or when notified by the Agricultural Commissioner's office that a pest problem is present on the project site. The assistance of a licensed pest control advisor is recommended. All treatments must be performed by a qualified applicator or a licensed pest control business; 	
		 All treatments must be performed by a qualified applicator or a licensed pest control operator; 	
		 "Control" means to reduce the population of common pests below economically damaging levels, and includes attempts to exclude pests before infestation, and effective control methods after infestation. Effective control methods may include physical/mechanical removal, bio control, cultural control, or chemical treatments; 	
		Use of "permanent" soil sterilants to control weeds or other pests is prohibited because this would interfere with reclamation;	

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Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation	Proposed Mitigation Measures	Significance After Mitigation
		Notify the Agricultural Commissioner's office immediately regarding any suspected exotic/invasive pest species as defined by the California Department of Food Agriculture and the U.S. Department of Agriculture. Request a sample be taken by the Agricultural Commissioner's Office of a suspected invasive species. Eradication of exotic pests shall be done under the direction of the Agricultural Commissioner's Office and/or California Department of Food and Agriculture;	
		Obey all pesticide use laws, regulations, and permit conditions;	
		Allow access by Agricultural Commissioner staff for routine visual and trap pest surveys, compliance inspections, eradication of exotic pests, and other official duties;	
		 Ensure all project employees that handle pest control issues are appropriately trained and certified, all required records are maintained and made available for inspection, and all required permits and other required legal documents are current; 	
		Maintain records of pests found and treatments or pest management methods used. Records should include the date, location/block, project name (current and previous if changed), and methods used. For pesticides include the chemical(s) used, EPA Registration numbers, application rates, etc. A pesticide use report may be used for this;	

Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation	Proposed Mitigation Measures	Significance After Mitigation
		Submit a report of monitoring, pest finds, and treatments, or other pest management methods to the Agricultural Commissioner quarterly within 15 days after the end of the previous quarter, and upon request. The report is required even if no pests were found or treatment occurred. It may consist of a copy of all records for the previous quarter, or may be a summary letter/report as long as the original detailed records are available upon request.	
		 A long-term strategy for weed and pest control and management during the operation of the proposed projects. Such strategies may include, but are not limited to: 	
		 Use of specific types of herbicides and pesticides on a scheduled basis. 	
		 Maintenance and management of project site conditions to reduce the potential for a significant increase in pest-related nuisance conditions on surrounding agricultural lands. 	
		 The project shall reimburse the Agricultural Commissioner's office for the actual cost of investigations, inspections, or other required non-routine responses to the site that are not funded by other sources. 	
Air Quality	1		
Impact 3.4-1: Conflict with or obstruct implementation of the applicable air quality plan	Less than Significant	Applicant Proposed Measure (APM) AQ-1 Fugitive Dust Control. Pursuant to ICAPCD, all construction sites, regardless of size, must comply with the requirements contained within Regulation VIII — Fugitive Dust Control Measures. Whereas these Regulation VIII measures are mandatory and are not considered	Less than Significant

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Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation	Proposed Mitigation Measures	Significance After Mitigation
		project environmental mitigation measures, the ICAPCD CEQA Handbook's required additional standard and enhanced mitigation measures listed below shall be implemented prior to and during construction. ICAPCD will verify implementation and compliance with these measures as part of the grading permit review/approval process.	
		ICAPCD Standard Measures for Fugitive Dust (PM ₁₀) Control	
		All disturbed areas, including bulk material storage, which is not being actively utilized, shall be effectively stabilized and visible emissions shall be limited to no greater than 20 percent opacity for dust emissions by using water, chemical stabilizers, dust suppressants, tarps, or other suitable material, such as vegetative ground cover.	
		 All on-site and offsite unpaved roads will be effectively stabilized, and visible emissions shall be limited to no greater than 20 percent opacity for dust emissions by paving, chemical stabilizers, dust suppressants, and/or watering. 	
		 All unpaved traffic areas 1 acre or more with 75 or more average vehicle trips per day will be effectively stabilized and visible emissions shall be limited to no greater than 20 percent opacity for dust emissions by paving, chemical stabilizers, dust suppressants, and/or watering. 	
		The transport of bulk materials shall be completely covered unless 6 inches of freeboard space from the top of the container is maintained with no spillage and loss of bulk material. In addition, the cargo compartment of all haul trucks is to be	

Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation	Proposed Mitigation Measures	Significance After Mitigation
		cleaned and/or washed at delivery site after removal of bulk material.	
		All track-out or carry-out will be cleaned at the end of each workday or immediately when mud or dirt extends a cumulative distance of 50 linear feet or more onto a paved road within an urban area.	
		 Movement of bulk material handling or transfer shall be stabilized prior to handling or at points of transfer with application of sufficient water, chemical stabilizers, or by sheltering or enclosing the operation and transfer line. 	
		 The construction of any new unpaved road is prohibited within any area with a population of 500 or more unless the road meets the definition of a temporary unpaved road. Any temporary unpaved road shall be effectively stabilized, and visible emissions shall be limited to no greater than 20 percent opacity for dust emission by paving, chemical stabilizers, dust suppressants, and/or watering. 	
		Standard Mitigation Measures for Construction Combustion Equipment	
		Use of alternative fueled or catalyst equipped diesel construction equipment, including all offroad and portable diesel-powered equipment.	
		Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes as a maximum.	

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Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation		Proposed Mitigation Measures	Significance After Mitigation
			 Limit, to the extent feasible, the hours of operation of heavy-duty equipment and/or the amount of equipment in use. 	
			 When commercially available, replace fossil fueled equipment with electrically driven equivalents (provided they are not run via a portable generator set). 	
		APM AQ-2	Construction Equipment. Construction equipment shall be equipped with an engine designation of EPA Tier 2 or better (Tier 2+). A list of the construction equipment, including all off-road equipment utilized at each of the projects by make, model, year, horsepower and expected/actual hours of use, and the associated EPA Tier shall be submitted to the County Planning and Development Services Department and ICAPCD prior to the issuance of a grading permit. The equipment list shall be submitted periodically to ICAPCD to perform a NOx analysis. ICAPCD shall utilize this list to calculate air emissions to verify that equipment use does not exceed significance thresholds. The Planning and Development Services Department and ICAPCD shall verify implementation of this measure.	
		APM AQ-3	Speed Limit. During construction and operation of the proposed project, the applicant shall limit the speed of all vehicles operating onsite on dirt roads to 15 miles per hour or less.	
		APM AQ-4	Dust Suppression. The project applicant shall employ a method of dust suppression (such as water or chemical stabilization) approved by ICAPCD. The project applicant shall apply chemical stabilization as directed by the product manufacturer to control dust between the panels as approved by ICAPCD, and other non-used areas (exceptions will be the paved entrance and parking area, and Fire Department	

Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation		Proposed Mitigation Measures	Significance After Mitigation
			access/emergency entry/exit points as approved by Fire/Office of Emergency Services [OES] Department).	
		APM AQ-5	Dust Suppression Management Plan. Prior to any earthmoving activity, the applicant shall submit a construction dust control plan and obtain ICAPCD and Imperial County Planning and Development Services Department (ICPDS) approval.	
		APM AQ-6	Operational Dust Control Plan. Prior to issuance of a Certificate of Occupancy, the applicant shall submit an operations dust control plan and obtain ICAPCD and ICPDS approval.	
			ICAPCD Rule 301 Operational Fees apply to any project applying for a building permit. At the time that building permits are submitted for the proposed project, ICAPCD shall review the project to determine if Rule 310 fees are applicable to the project.	
Biological Resources				
Impact 3.5-1: Potential impacts on special-status species	Potentially Significant	BIO-1	General Impact Avoidance and Minimization Measures. The following measures will be applicable throughout the life of the project: To reduce the potential indirect impact on migratory birds, bats and raptors, the project will comply with the APLIC 2012 Guidelines for overhead utilities, as appropriate, to minimize avian collisions with transmission facilities (APLIC 2012)	Less than Significant
			 All electrical components on the project site shall be either undergrounded or protected so that there will be no exposure to wildlife and therefore no potential for electrocution. 	

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Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation	Proposed Mitigation Measures	Significance After Mitigation
		• The project proponent shall designate a Project Biologist who shall be responsible for overseeing compliance with protective measures for the biological resources during vegetation clearing and work activities within and adjacent to areas of native habitat. The Project Biologist will be familiar with the local habitats, plants, and wildlife. The Project Biologist will also maintain communications with the Contractor to ensure that issues relating to biological resources are appropriately and lawfully managed and monitor construction. The Project Biologist will monitor activities within construction areas during critical times, such as vegetation removal, the implementation of Best Management Practices (BMP), and installation of security fencing to protect native species. The Project Biologist will ensure that all wildlife and regulatory agency permit requirements, conservation measures, and general avoidance and minimization measures are properly implemented and followed.	
		 The boundaries of all areas to be newly disturbed (including solar facility areas, staging areas, access roads, and sites for temporary placement of construction materials and spoils) will be delineated with stakes and flagging prior to disturbance. All disturbances, vehicles, and equipment will be confined to the flagged areas. 	
		 No potential wildlife entrapments (e.g., trenches, bores) will be left uncovered overnight. Any uncovered pitfalls will be excavated to 3:1 slopes at the ends to provide wildlife escape ramps. Alternatively, man-made ramps may be installed. Covered pitfalls will be covered completely to prevent access by small mammals or reptiles. 	
		 To avoid wildlife entrapment (including birds), all pipes or other construction materials or supplies will be covered or 	

Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation		Proposed Mitigation Measures	Significance After Mitigation
			capped in storage or laydown area, and at the end of each work day in construction, quarrying and processing/handling areas. No pipes or tubing of sizes or inside diameters ranging from 1 to 10 inches will be left open either temporarily or permanently.	
		•	No anticoagulant rodenticides, such as Warfarin and related compounds (indandiones and hydroxycoumarins), may be used within the project site, on off-site project facilities and activities, or in support of any other project activities.	
		•	Avoid wildlife attractants. All trash and food-related waste shall be placed in self-closing containers and removed regularly from the site to prevent overflow. Workers shall not feed wildlife. Water applied to dirt roads and construction areas for dust abatement shall use the minimal amount needed to meet safety and air quality standards to prevent the formation of puddles, which could attract wildlife. Pooled rainwater or floodwater within retention basins will be removed to avoid attracting wildlife to the active work areas.	
		•	To minimize the likelihood for vehicle strikes on wildlife, speed limits will not exceed 15 miles per hour when driving on access roads. All vehicles required for O&M must remain on designated access/maintenance roads.	
		•	Avoid night-time construction lighting or if nighttime construction cannot be avoided use shielded directional lighting pointed downward and towards the interior of the project site, thereby avoiding illumination of adjacent natural areas and the night sky.	
		•	All construction equipment used for the project will be equipped with properly operating and maintained mufflers.	
		•	Hazardous materials and equipment stored overnight, including small amounts of fuel to refuel hand-held	

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Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation	Proposed Mitigation Measures	Significance After Mitigation
		equipment, will be stored within secondary containment when within 50 feet of open water to the fullest extent practicable. Secondary containment will consist of a ring of sand bags around each piece of stored equipment/structure. A plastic tarp/visqueen lining with no seams shall be placed under the equipment and over the edges of the sandbags, or a plastic hazardous materials secondary containment unit shall be utilized by the Contractor.	
		 The Contractor will be required to conduct vehicle refueling in upland areas where fuel cannot enter waters of the U.S. and in areas that do not have potential to support federally threatened or endangered species. Any fuel containers, repair materials, including creosote-treated wood, and/or stockpiled material that is left on site overnight, will be secured in secondary containment within the work area and staging/assembly area and covered with plastic at the end of each work day. 	
		 In the event that no activity is to occur in the work area for the weekend and/or a period of time greater than 48 hours, the Contractor will ensure that all portable fuel containers are removed from the project site. 	
		 All equipment will be maintained in accordance with manufacturer's recommendations and requirements. 	
		 Equipment and containers will be inspected daily for leaks. Should a leak occur, contaminated soils and surfaces will be cleaned up and disposed of following the guidelines identified in the Stormwater Pollution Prevention Plan or equivalent, Materials Safety Data Sheets, and any specifications required by other permits issued for the project. 	

Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation	Proposed Mitigation Measures	Significance After Mitigation
		 The Contractor will utilize off-site maintenance and repair shops as much as possible for maintenance and repair of equipment. 	
		 If maintenance of equipment must occur onsite, fuel/oil pans, absorbent pads, or appropriate containment will be used to capture spills/leaks within all areas. Where feasible, maintenance of equipment will occur in upland areas where fuel cannot enter waters of the U.S. and in areas that do not have potential to support federally threatened or endangered species. 	
		 Appropriate BMPs will be used by the Contractor to control erosion and sedimentation and to capture debris and contaminants from bridge construction to prevent their deposition in waterways. No sediment or debris will be allowed to enter the creek or other drainages. All debris from construction of the bridge will be contained so that it does not fall into channel. Appropriate BMPs will be used by the Contractor during construction to limit the spread of resuspended sediment and to contain debris. 	
		 Erosion and sediment control devices used for the proposed project, including fiber rolls and bonded fiber matrix, will be made from biodegradable materials such as jute, with no plastic mesh, to avoid creating a wildlife entanglement hazard. 	
		 Firearms, open fires, and pets would be prohibited at all work locations and access roads. Smoking would be prohibited along the project alignment. 	
		 Cross-country vehicle and equipment use outside of approved designated work areas and access roads shall be prohibited to prevent unnecessary ground and vegetation disturbance. 	

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Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation	Proposed Mitigation Measures	Significance After Mitigation
		 Any injured or dead wildlife encountered during project-related activities shall be reported to the project biologist, biological monitor, CDFW, or a CDFW-approved veterinary facility as soon as possible to report the observation and determine the best course of action. For special-status species, the Project Biologist shall notify the County, USFWS, and/or CDFW, as appropriate, within 24 hours of the discovery. 	
		 Stockpiling of material will be allowed only within established work areas. 	
		 Actively manage the spread of noxious weeds 	
		The ground beneath all parked equipment and vehicles shall be inspected for wildlife before moving.	
		BIO-2 Worker Environmental Awareness Program. Prior to project construction, a Worker Environmental Awareness Program shall be developed and implemented by a qualified biologist, and shall be available in both English and Spanish. Handouts summarizing potential impacts to special-status biological resources and the potential penalties for impacts to these resources shall be provided to all construction personnel. At a minimum, the education program shall including the following:	
		 the purpose for resource protection; 	
		 a description of special status species including representative photographs and general ecology; 	
		 occurrences of USACE, RWQCB, and CDFW regulated features in the project survey area; 	
		 regulatory framework for biological resource protection and consequences if violated; 	
		 sensitivity of the species to human activities; 	

Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation	Proposed Mitigation Measures	Significance After Mitigation
Environmental Impact		Proposed Mitigation Measures avoidance and minimization measures designed to reduce the impacts to special-status biological resources; environmentally responsible construction practices; reporting requirements; the protocol to resolve conflicts that may arise at any time during the construction process; and workers sign acknowledgement form indicating that the Environmental Awareness Training and Education Program that has been completed and would be kept on record. BIO-3 Burrowing Owl Avoidance and Minimization. Take avoidance (pre construction) surveys for burrowing owl shall be completed prior to project construction. Surveys shall be conducted as detailed within Appendix D of the Staff Report on Burrowing Owl Mitigation (California Department of Fish and Game [CDFG] 2012). If burrowing owl is not detected, construction may proceed. If burrowing owl is identified during the non breeding season (September 1 through January 31), then a 50-meter buffer will be established by the biological monitor. Construction within the buffer will be avoided until a qualified biologist determines that burrowing owl is no longer present or until a CDFW approved exclusion plan has been implemented. The buffer distance may be reduced if noise attenuation buffers such as hay bales are placed between the occupied burrow and construction activities.	
		 If burrowing owl is identified during the breeding season (February 1 through August 31), then an appropriate buffer will be established by the biological monitor in accordance with the Staff Report on Burrowing Owl Mitigation (CDFG 2012). Construction within the buffer will be avoided until a 	

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Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation		Proposed Mitigation Measures	Significance After Mitigation
			qualified biologist determines that burrowing owl is no longer present or until young have fledged. The buffer distance may be reduced in consultation with CDFW if noise attenuation buffers such as hay bales are placed between the occupied burrow and construction activities.	
		BIO-4	Pre-Construction Nesting Bird Survey. If construction or other project activities are scheduled to occur during the bird breeding season (typically February 1 through August 31 for raptors and March 15 through August 31 for the majority of migratory bird species), a pre-construction nesting-bird survey shall be conducted by a qualified avian biologist to ensure that active bird nests, including those for the loggerhead shrike and mountain plover will not be disturbed or destroyed.	
			The survey shall be completed no more than three days prior to initial ground disturbance. The nesting-bird survey shall include the project site and adjacent areas where project activities have the potential to affect active nests, either directly or indirectly due to construction activity or noise. If an active nest is identified, the biologist shall establish an appropriately sized disturbance-limit buffer around the nest using flagging or staking. Construction activities shall not occur within any disturbance-limit buffer zones until the nest is deemed inactive by the qualified biologist. If construction activities cease for a period of greater than three days during the bird breeding season, a pre-construction nesting bird survey shall be conducted prior to the commencement of activities.	
			Final construction buffers or setback distances shall be determined by the qualified biologist in coordination with USFWS and CDFW on a case-by-case basis, depending on the species, season in which disturbance shall occur, the type of disturbance, and other factors that could influence susceptibility to disturbance (e.g., topography, vegetation, existing disturbance levels, etc.).	

Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation		Proposed Mitigation Measures	Significance After Mitigation	
Cultural Resources					
Impact 3.6-1: Impact on historical resources	Potentially Significant	CUL-1	Cultural Monitoring. Prior to construction, the project Applicant shall retain the services of a Qualified Professional Archaeologist meeting the Secretary of the Interior's Standards for a Qualified Archaeologist and require that all initial ground-disturbing work be monitored by someone trained in artifact and feature identification in monitoring contexts. A Supervising Archaeological Specialist and a Paleontological Monitor, to be retained by the project applicant, will be required to be present at the project construction phase kickoff meeting.	Less than Significant	
		CUL-2	Worker Environmental Awareness Program. Prior to any ground disturbance, the supervising Archaeological Resources Specialist and Archaeological Resources Monitor shall conduct initial Worker Environmental Awareness Program (WEAP) training to all construction personnel, including supervisors, present at the outset of the project construction work phase, for which the Lead Contractor and all subcontractors shall make their personnel available. This WEAP training will educate construction personnel on how to work with the monitor(s) to identify and minimize impacts to paleontological resources and maintain environmental compliance and be performed periodically for new personnel coming on to the project as needed.		
		CUL-3	Discovery of Previously Unidentified Archaeological Materials. In the event of the discovery of previously unidentified archaeological materials, the construction contractor shall immediately cease all work activities within approximately 100 feet of the discovery. After cessation of excavation, the construction contractor shall immediately contact the Imperial County Department of Planning and Development Services. Except in the case of cultural items that fall within the scope of the Native American Grave Protection and Repatriation Act, the discovery of any cultural resource		

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Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation	Proposed Mitigation Measures	Significance After Mitigation
		within the project area shall not be grounds for a "stop work" notice or otherwise interfere with the project's continuation except as set forth in this paragraph. In the event of an unanticipated discovery of archaeological materials during construction, the project Applicant shall retain the services of a Qualified Professional Archaeologist meeting the Secretary of the Interior's Standards for a Qualified Archaeologist to evaluate the significance of the materials prior to resuming any construction-related activities in the vicinity of the find. If the Qualified Archaeologist determines that the discovery constitutes a significant resource under CEQA and it cannot be avoided, the project Applicant shall implement an archaeological data recovery program.	
		CUL-4 Schedule of Ground-Disturbing Activities. The construction contractor shall provide the Supervising Archaeological Resources Specialist with a schedule of initial potential ground-disturbing activities. A minimum of 48 hours will be provided of commencement of any initial ground-disturbing activities such as vegetation grubbing or clearing, grading, trenching, or mass excavation.	
		As detailed in the schedule provided, an Archaeological Monitor shall be present on site at the commencement of ground-disturbing activities related to the project. The monitor, in consultation with the Supervising Archaeologist, shall observe initial ground-disturbing activities and, as they proceed, make adjustments to the number of monitors as needed to provide adequate observation and oversight. All monitors will have stopwork authority to allow for recordation and evaluation of finds during construction. The monitor will maintain a daily record of observations to serve as an ongoing reference resource and to provide a resource for final reporting upon completion of the project.	

Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation		Proposed Mitigation Measures	Significance After Mitigation
			The Supervising Archaeologist, Archaeological Monitor, and the lead contractor and subcontractors shall maintain a line of communication regarding schedule and activity such that the monitor is aware of all ground-disturbing activities in advance in order to provide appropriate oversight.	
		CUL-5	Discovery of Archaeological Resources. If archaeological resources are discovered, construction shall be halted within 50 feet of the find and shall not resume until a Qualified Archaeologist can determine the significance of the find and/or the find has been fully investigated, documented, and cleared.	
		CUL-6	Archaeological Resources Monitoring Report. At the completion of all ground-disturbing activities, the Consultant shall prepare an Archaeological Resources Monitoring Report summarizing all monitoring efforts and observations, as performed, and any and all prehistoric or historic archaeological finds as well as providing follow-up reports of any finds to the South Coastal Information Center (SCIC), as required.	
Impact 3.6-2: Impact on archaeological resources	Potentially Significant	Implement Mitigation Measures CUL-1 through CUL-6.		Less than Significant
Impact 3.6-3: Impact on Human Remains	Potentially Significant	CUL-7 Discovery of Human Remains. In the unlikely event that human remains are discovered during ground-disturbing activities, then the proposed project would be subject to California Health and Safety Code 7050.5, CEQA Section 15064.5, and California Public Resources Code Section 5097.98 (NPS 1983).If human remains are found during ground-disturbing activities, State of California Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the Imperial County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. In the event of an unanticipated discovery of human remains, the Imperial County Coroner shall be notified immediately. If the human remains are determined to be		Less than Significant

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Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation	Proposed Mitigation Measures	Significance After Mitigation
		prehistoric, the County Coroner shall notify the NAHC, which shall notify a most likely descendant (MLD). The MLD shall complete the inspection of the site within 48 hours of notification and may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.	
Geology and Soils			
Impact 3.7-2: Possible risks to people and structures caused by strong seismic ground shaking	Potentially Significant	Prepare Geotechnical Report(s) as Part of Final Engineering for the Project and Implement Required Measures. Facility design for all project components shall comply with the site-specific design recommendations as provided by a licensed geotechnical or civil engineer to be retained by the project applicant. The final geotechnical and/or civil engineering report shall address and make recommendations on the following: Site preparation Soil bearing capacity Appropriate sources and types of fill Potential need for soil amendments Structural foundations Grading practices Soil corrosion of concrete and steel Erosion/winterization Seismic ground shaking Liquefaction Expansive/unstable soils	Less than Significant

Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation	Proposed Mitigation Measures	Significance After Mitigation
		In addition to the recommendations for the conditions listed above, the geotechnical investigation shall include subsurface testing of soil and groundwater conditions, and shall determine appropriate foundation designs that are consistent with the version of the CBC that is applicable at the time building and grading permits are applied for. All recommendations contained in the final geotechnical engineering report shall be implemented by the project applicant. The final geotechnical and/or civil engineering report shall be submitted to Imperial County Public Works Department, Engineering Division for review and approval prior to issuance of building permits.	
Impact 3.7-3: Possible risks to people and structures caused by seismic-related ground failure, including liquefaction	Potentially Significant	Implement Mitigation Measure GEO-1.	Less than Significant
Impact 3.7-5: Substantial soil erosion or the loss of topsoil	Potentially Significant	Implement Mitigation Measure GEO-1 and Mitigation Measure HYD-1.	Less than Significant
Impact 3.7-6: Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project	Potentially Significant	Implement Mitigation Measure GEO-1.	Less than Significant
Impact 3.7-7: Be located on expansive soil, as defined in Table 18 1 B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property	Potentially Significant	Implement Mitigation Measure GEO-1.	Less than Significant
Impact 3.7-9: Impact on paleontological resources	Potentially Significant	GEO-2 Paleontological Mitigation and Monitoring Plan. Once a geotechnical report has been completed for the project, a qualified paleontologist shall review the boring logs and determine how deep paleontologically sensitive formations may	Less than Significant

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Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation		Proposed Mitigation Measures	Significance After Mitigation
			be across the project site. The paleontologist shall use this information along with the results of the paleontological survey to determine if paleontological monitoring is warranted. If monitoring is warranted, a qualified paleontologist shall prepare a mitigation and monitoring plan to be implemented during project construction.	
		GEO-3	Paleontological Monitoring. Prior to construction, the project applicant shall retain the services of a Qualified Paleontologist and require that all initial ground-disturbing work be monitored by someone trained in fossil identification in monitoring contexts. A Supervising Paleontological Specialist and a Paleontological Monitor, to be retained by the project applicant, will be required to be present at the project construction phase kickoff meeting.	
		GEO-4	Worker Environmental Awareness Program. Prior to any ground disturbance, the Supervising Paleontological Resources Specialist and Paleontological Resources Monitor shall conduct initial Worker Environmental Awareness Program (WEAP) training to all construction personnel, including supervisors, present at the outset of the project construction work phase, for which the Lead Contractor and all subcontractors shall make their personnel available. This WEAP training will educate construction personnel on how to work with the monitor(s) to identify and minimize impacts to paleontological resources and maintain environmental compliance and be performed periodically for new personnel coming on to the project as needed.	
		GEO-5	Schedule of Ground-Disturbing Activities. During construction, the construction contractor shall provide the Supervising Paleontological Resources Specialist with a schedule of initial potential ground-disturbing activities. A minimum of 48 hours will be provided of commencement of any	

Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation		Proposed Mitigation Measures	Significance After Mitigation
			initial ground-disturbing activities such as vegetation grubbing or clearing, grading, trenching, or mass excavation.	
			As detailed in the schedule provided, a Paleontological Monitor shall be present on site at the commencement of ground-disturbing activities related to the project. The monitor, in consultation with the Supervising Paleontologist, shall observe initial ground-disturbing activities and, as they proceed, make adjustments to the number of monitors as needed to provide adequate observation and oversight. All monitors will have stopwork authority to allow for recordation and evaluation of finds during construction. The monitor will maintain a daily record of observations to serve as an ongoing reference resource and to provide a resource for final reporting upon completion of the project.	
			The Supervising Paleontologist, Paleontological Monitor, and the Lead Contractor and subcontractors shall maintain a line of communication regarding schedule and activity such that the monitor is aware of all ground-disturbing activities in advance in order to provide appropriate oversight.	
		GEO-6	Discovery of Paleontological Resources. During construction, if paleontological resources are discovered, construction shall be halted within 50 feet of any paleontological finds and shall not resume until a Qualified Paleontologist can determine the significance of the find and/or the find has been fully investigated, documented, and cleared.	
		GEO-7	Paleontological Resources Monitoring Report. At the completion of all ground-disturbing activities, the Supervising Paleontological Specialist shall prepare a Paleontological Resources Monitoring Report summarizing all monitoring efforts and observations, as performed, and any and all paleontological finds.	

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Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Impact 3.10-1: Violation of water quality standards Potentially Significant HYD-1 Prepare SWPPP and Implement BMPs Prior to Construction and Site Restoration. The project applicant or its contractor shall prepare a SWPPP specific to the project and be responsible for securing coverage under SWRCB's NPDES stormwater permit for general construction activity (Order 2009-0009-DWQ). The SWPPP shall identify specific actions and BMPs relating to the prevention of stormwater pollution from	Environmental Impact	Significance Before Mitigation	Proposed Mitigation Measures	Significance After Mitigation
project-related construction sources by identifying a practical sequence for site restoration, BMP implementation, contingency measures, responsible parties, and agency contacts. The SWPPP shall reflect localized surface hydrological conditions and shall be reviewed and approved by the appropriate agency prior to commencement of work and shall be made conditions of the contract with the contractor selected to build and decommission the project. The SWPPP shall incorporate control measures in the following categories: Soil stabilization and erosion control practices (e.g., hydroseeding, erosion control blankets, mulching) Sediment control practices (e.g., temporary sediment basins, fiber rolls) Temporary and post-construction on- and off-site runoff controls Special considerations and BMPs for water crossings and drainages Monitoring protocols for discharge(s) and receiving waters, with emphasis place on the following water quality objectives: dissolved oxygen, floating material, oil and grease, potential of hydrogen (pH), and turbidity Waste management, handling, and disposal control practices Corrective action and spill contingency measures		Potentially Significant	 and Site Restoration. The project applicant or its contractor shall prepare a SWPPP specific to the project and be responsible for securing coverage under SWRCB's NPDES stormwater permit for general construction activity (Order 2009-0009-DWQ). The SWPPP shall identify specific actions and BMPs relating to the prevention of stormwater pollution from project-related construction sources by identifying a practical sequence for site restoration, BMP implementation, contingency measures, responsible parties, and agency contacts. The SWPPP shall reflect localized surface hydrological conditions and shall be reviewed and approved by the appropriate agency prior to commencement of work and shall be made conditions of the contract with the contractor selected to build and decommission the project. The SWPPP shall incorporate control measures in the following categories: Soil stabilization and erosion control practices (e.g., hydroseeding, erosion control blankets, mulching) Sediment control practices (e.g., temporary sediment basins, fiber rolls) Temporary and post-construction on- and off-site runoff controls Special considerations and BMPs for water crossings and drainages Monitoring protocols for discharge(s) and receiving waters, with emphasis place on the following water quality objectives: dissolved oxygen, floating material, oil and grease, potential of hydrogen (pH), and turbidity Waste management, handling, and disposal control practices 	Less than Significant

Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation	Proposed Mitigation Measures	Significance After Mitigation
		Agency and responsible party contact information Training procedures that shall be used to ensure that workers are aware of permit requirements and proper installation methods for BMPs specified in the SWPPP The SWPPP shall be prepared by a Qualified SWPPP Practitioner and/or Qualified SWPPP Developer with BMPs selected to achieve maximum pollutant removal and that represent the best available technology that is economically achievable. Emphasis for BMPs shall be placed on controlling discharges of oxygen-depleting substances, floating material, oil and grease, acidic or caustic substances or compounds, and turbidity. BMPs for soil stabilization and erosion control practices and sediment control practices will also be required. Performance and effectiveness of these BMPs shall be determined either by visual means where applicable (i.e., observation of above-normal sediment release), or by actual water sampling in cases where verification of contaminant reduction or elimination, (inadvertent petroleum release) is required to determine adequacy of the measure.	
		HYD-2 Incorporate Post-Construction Runoff BMPs into Project Drainage Plan. The project Drainage Plan shall adhere to the County's Engineering Guidelines Manual, IID "Draft" Hydrology Manual, or other recognized source with approval by the County Engineer to control and manage the on- and off-site discharge of stormwater to existing drainage systems. Infiltration basins will be integrated into the Drainage Plan to the maximum extent practical. The Drainage Plan shall provide both short- and long-term drainage solutions to ensure the proper sequencing of drainage facilities and management of runoff generated from project impervious surfaces as necessary.	

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Table ES-1. Summary of Project Impacts and Proposed Mitigation Measures

Environmental Impact	Significance Before Mitigation	Proposed Mitigation Measures	Significance After Mitigation
Impact 3.10-3: Alter the existing drainage pattern of the site or area resulting in siltation or on- or off-site erosion	Potentially Significant	Implement Mitigation Measure HYD-1.	Less than Significant
Impact 3.10-4: Alter the existing drainage pattern of the site or area resulting in flooding on- or off-site	Potentially Significant	Implement Mitigation Measure HYD-2.	Less than Significant
Impact 3.10-5: Alter the existing drainage pattern of the site or area such that runoff increases would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff	Potentially Significant	Implement Mitigation Measure HYD-1.	Less than Significant
Impact 3.10-8: Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan	Potentially Significant	Implement Mitigation Measures HYD-1 and HYD-2.	Less than Significant

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Statement of Overriding Considerations

CEQA Guidelines Section 15093 requires the Lead Agency to balance, as applicable, the economic, legal, social, and technological, or other benefits of the project against its unavoidable environmental risks when determining whether to approve the project. No significant and unmitigated impacts have been identified for the proposed project; therefore, the County would not be required to adopt a Statement of Overriding Considerations pursuant to Section 15093 for this project.

Project Alternatives

Alternatives Considered but Rejected

Alternative Site

Section 15126.6(f)(2) of the CEQA Guidelines addresses alternative locations for a project. The key question and first step in the analysis is whether any of the significant effects of the proposed project would be avoided or substantially lessened by constructing the proposed project in another location. Only locations that would avoid or substantially lessen any of the significant effects of the project need to be considered for inclusion in the EIR. Further, CEQA Guidelines Section 15126.6(f)(1) states that among the factors that may be taken into account when addressing the feasibility of alternative locations are whether the project proponent can reasonably acquire, control or otherwise have access to the alternative site (or the site is already owned by the proponent).

With respect to the proposed project, no significant, unmitigable impacts have been identified. With implementation of proposed mitigation, all potentially significant environmental impacts will be mitigated to a level less than significant.

The Applicant investigated the opportunity to develop the project site in the general project area and determined that the currently proposed project site is the most suitable for development of the solar facility. An alternative site was considered and is located south of the project site on privately-owned agricultural lands, similar to the project site. The site, located on Assessor's Parcel Numbers (APN) 037-160-017, 037-160-018, and 037-160-019 totals approximately 282 acres of land.

However, this site was rejected from detailed analysis for the following reasons:

The alternative location site, as compared to the proposed project site, is located immediately north of State Route 78, a major U.S. State Highway traversed by large numbers of transient public viewers. When compared to the proposed project, the alternative site would result in potentially significant impacts associated with aesthetics and visual quality. While the proposed project identified no significant impacts for aesthetics and visual quality, implementation of the solar project at the alternative location site has the potential to permanently alter the existing visual character and visual quality of the alternative site, which is characterized by agricultural lands and minor agricultural development under existing viewer locations from SR 78, looking north. As such, aesthetic impacts at the alternative location site, adjacent to SR 78, would be greater than those at the proposed project site, which is located adjacent to small, less-traveled, agricultural roads (N Best Road and Baughman Road), approximately 0.7 mile east of the major thoroughfare, SR 111.

Similarly, a glare hazard analysis prepared for the project (Appendix B of this EIR) concluded that sensitive viewers near the proposed project, including residences, a nearby golf course, major roadways, and approach slopes associated with the Brawley Municipal Airport, would

not experience glare effects from the project. Comparatively, due to the alternative site location's close proximity immediately north of SR 78, potential glare impacts resulting from the solar array would be potentially significant to viewers traveling on SR 78.

- The alternative location site, as compared to the proposed project site, is bisected by the Shellenberger Drain. With the implementation of mitigation, impacts on surface water quality as attributable to the proposed project, which has been designed to avoid bisecting any waterways, would be reduced to a less than significant level. However, construction activities at the alternative site location have the potential to impact hydrology and water quality (due to the presence of the Shellenberger Drain) when compared to the proposed project site.
- No significant, unmitigated impacts have been identified for the proposed project. Construction
 and operation of the proposed project at this alternative location would likely result in similar
 impacts associated with the proposed project, or additional impacts (to hydrology and water
 quality) that are currently not identified for the project at the currently proposed location.

As such, the County considers this alternative location infeasible and rejects further analysis of this alternative because of the factors listed above.

Alternatives Evaluated

The environmental analysis for the proposed project evaluated the potential environmental impacts resulting from implementation of the proposed project, as well as alternatives to the project. The alternatives include: Alternative 1: No Project/No Development; Alternative 2: Development within Renewable Energy Overlay Zone – Agricultural Lands; Alternative 3: Development within Renewable Energy Overlay Zone – Desert Lands; and Alternative 4: Distributed Commercial and Industrial Rooftop Solar Only Alternative. A detailed discussion of the alternatives considered is included in Chapter 7. Table ES-2 summarizes the impacts resulting from the proposed project and the identified alternatives.

Alternative 1: No Project/No Development Alternative

The CEQA Guidelines require analysis of the No Project Alternative (PRC Section 15126). According to Section 15126.6(e), "the specific alternative of 'no project' shall also be evaluated along with its impacts. The 'no project' analysis shall discuss the existing conditions at the time the Notice of Preparation is published, at the time environmental analysis is commenced, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services."

The No Project/No Development Alternative assumes that the project, as proposed, would not be implemented and the project site would not be developed.

The No Project/No Development Alternative would not meet a majority of the objectives of the project. Additionally, the No Project/No Development Alternative would not help California meet its statutory and regulatory goal of increasing renewable power generation, including GHG reduction goals of Senate Bill 32).

Alternative 2: Development within Renewable Energy Overlay Zone – Agricultural Lands

The purpose of this alternative is to develop the proposed project within the existing boundary of County's Renewal Energy (RE) Overlay Zone. The RE Overlay Zone is concentrated in areas

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determined to be the most suitable for the development of renewable energy facilities while minimizing the impact on other established areas.

The Alternative 2 project site is located entirely within the RE Overlay Zone. Alternative 2 would involve the construction and operation of a 40 MW solar energy facility and associated infrastructure on approximately 231-acre project site (APN 026-030-008) located approximately 11 miles northeast of Brawley in unincorporated Imperial County. The Alternative 2 project site is designated as Agriculture under the County's General Plan and zoned S-2-RE and A-3-RE (Open Space/Preservation and Heavy Agriculture, both within the RE Overlay Zone).

Similar to the proposed project, Alternative 2 would require approval of a CUP to allow for the construction and operation of a solar project. However, compared to the proposed project, the Alternative 2 project site is located within the RE Overlay Zone and, as such, would not require a General Plan Amendment or Zone Change to include/classify the project site into the RE Overlay Zone. Additionally, while the proposed project (A-2-G Zone) would not require a Variance, the S-2-RE Zone associated with the Alternative 2 site allows a maximum height limit of 40 feet for non-residential structures and 100 feet for communication towers. As such, a Variance would be required under this alternative because the proposed height of the transmission towers (66 feet) and microwave tower (maximum of 100 feet) would exceed 40 feet. This alternative's gen-tie line could potentially interconnect to IID's existing Midway Substation located approximately 4.75 miles northwest of the solar facility. Consultation and coordination with IID would be required to determine if the Midway Substation has existing capacity or would require upgrades for this alternative's interconnection.

Alternative 2 would meet most of the basic objectives of the proposed project and should remain under consideration. However, this alternative would result in greater impacts for the following environmental issue areas as compared to the proposed project: cultural resources, hydrology and water quality, and tribal cultural resources. Further, the project applicant does not own, or otherwise control this property.

Alternative 3: Development within Renewable Energy Overlay Zone – Desert Lands

The purpose of this alternative is to develop the proposed project within the existing boundary of the County's RE Overlay Zone. The Alternative 3 project site is located entirely within the RE Overlay Zone. Alternative 3 would involve the construction and operation of a solar energy facility and associated infrastructure on five parcels totaling approximately 288 acres (APN 021-190-003; 021-380-004; 021-380-005; 021-380-012; and 021-380-013) located approximately 0.5 mile south of Slab City. This alternative is 61 acres larger than the proposed project site. Therefore, more solar panels could be installed on this site compared to the proposed project. The Alternative 3 project site is located on undeveloped desert land. Existing transmission lines traverse the southwest corner of the project site.

The Alternative 3 project site is located within the RE Overlay Zone and would not require a General Plan Amendment or Zone Change to include/classify the project site into the RE Overlay Zone. The Alternative 3 project site is designated as Recreation under the County's General Plan and zoned General Agricultural with a renewable energy overlay (A-2-RE).

Similar to the proposed project, Alternative 3 will require approval of a CUP to allow for the construction and operation of a solar project. Compared to the proposed project, the Alternative 3 project site is located within the RE Overlay Zone and would not require a General Plan Amendment or Zone Change to include/classify the project site into the RE Overlay Zone. Similar to the proposed project site, the A-2-RE zone allows a maximum height limit of 120 feet for non-residential structures. No Variance would be required under this alternative because the proposed height of the transmission

towers (66 feet) would not exceed 120 feet. This alternative's gen-tie line could potentially interconnect to IID's existing Midway Substation located approximately 4 miles southeast of the solar facility. Consultation and coordination with IID would be required to determine if the Midway Substation has existing capacity or would require upgrades for this alternative's interconnection.

Alternative 3 would meet most of the basic objectives of the proposed project and should remain under consideration. However, this alternative would result in greater impacts for the following environmental issue areas as compared to the proposed project: aesthetics, air quality, biological resources, cultural resources, hydrology/water quality, tribal cultural resources, and utilities and service systems. Further, the project applicant does not own, or otherwise control this property.

Alternative 4: Distributed Commercial and Industrial Rooftop Solar Only Alternative

This alternative would involve the development of a number of geographically distributed small to medium solar PV systems (100 kilowatts to 1 MW) within existing developed areas, typically on the rooftops of commercial and industrial facilities throughout Imperial County. Under this alternative, no new land would be developed or altered. Depending on the type of solar modules installed and the type of tracking equipment used, a similar or greater amount of acreage (i.e., greater than 200 acres of total rooftop area) may be required to attain the proposed project's capacity of 40 MW of solar PV generating capacity. This alternative would involve placement of PV structures, transmission lines, and development of additional supporting facilities, such as switching stations and substations at various locations throughout the County. This alternative assumes that rooftop development would occur primarily on commercial and industrial structures due to the greater availability of large, relatively flat roof areas necessary for efficient solar installations.

This alternative would require hundreds of installation locations across Imperial County, many of which would require approval of discretionary actions, such as design review, CUPs, or zone variances depending on local jurisdictional requirements. Similar to the proposed project, this alternative would be designed to operate year-round using PV panels to convert solar energy directly to electrical power. This alternative would involve the construction of transmission lines and development of additional supporting facilities, such as switching stations and substations at various locations throughout the County to distribute the energy.

Rooftop PV systems exist in small areas throughout California. Larger distributed solar PV installations are becoming more common. An example of a distributed PV system is 1 MW of distributed solar energy installed by Southern California Edison on a 458,000 square-foot industrial building in Chino, California.¹

Similar to utility-scale PV systems, the acreage of rooftops or other infrastructure required per MW of electricity produced is wide ranging, which is largely due to site-specific conditions (e.g., solar insolation levels, intervening landscape or topography, PV panel technology, etc.). Based on SCE's use of 458,000-square feet for 1 MW of energy, approximately 18,320,000 square feet (approximately 420 acres) would be required to produce 40 MW.

As shown on Table ES-2, implementation of Alternative 4: Distributed Commercial and Industrial Rooftop Solar Only Alternative would avoid impacts on agricultural resources compared to the proposed project. It would result in reduced impacts for the following environmental issue areas as

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http://newsroom.edison.com/releases/california-regulators-approve-southern-california-edison-proposal-to-create-nations-largest-solar-panel-installation-program

compared to the proposed project: hydrology/water quality. Overall, this alternative would result in greater impacts related to aesthetics, air quality, biological resources, cultural resources, tribal cultural resources, and utilities and service systems.

Environmentally Superior Alternative

Table ES-2 provides a qualitative comparison of the impacts for each alternative compared to the proposed project. The No Project/No Development Alternative would be considered the environmentally superior alternative, since it would eliminate all of the significant impacts identified for the project. However, CEQA Guidelines Section 15126.6(e)(2) states that "if the environmentally superior alternative is the No Project Alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives." As shown on Table ES-2, Alternative 2 would be the environmental superior alternative because it would reduce impacts for the following environmental issue areas as compared to the proposed project: aesthetics and agricultural resources. Alternative 2 would meet most of the basic objectives of the proposed project. However, the project applicant does not own, or otherwise control this property.

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Table ES-2. Comparison of Alternative Impacts to Proposed Project

Environmental Issue Area	Proposed Project	Alternative 1: No Project/No Development	Alternative 2: Development within Renewable Energy Overlay Zone – Agricultural Lands	Alternative 3: Development within Renewable Energy Overlay Zone – Desert Lands	Alternative 4: Distributed Commercial and Industrial Rooftop Solar Only Alternative
Aesthetics	Less than Significant	CEQA Significance: No Impact Comparison to Proposed Project: Less Impact	CEQA Significance: Potentially Significant Comparison to Proposed Project: Less Impact	CEQA Significance: Potentially Significant Comparison to Proposed Project: Greater Impact	CEQA Significance: Potentially Significant Comparison to Proposed Project: Greater Impact
Agricultural Resources	Less than Significant with Mitigation	CEQA Significance: No Impact Comparison to Proposed Project: Avoid	CEQA Significance: Less than Significant with Mitigation Comparison to Proposed Project: Less Impact	CEQA Significance: No Impact Comparison to Proposed Project: Avoid	CEQA Significance: No Impact Comparison to Proposed Project: Avoid
Air Quality	Less than Significant	CEQA Significance: No Impact Comparison to Proposed Project: Less Impact	CEQA Significance: Less than Significant Comparison to Proposed Project: Similar	CEQA Significance: Potentially Significant Comparison to Proposed Project: Greater Impact	CEQA Significance: Potentially Significant Comparison to Proposed Project: Greater Impact
Biological Resources	Less than Significant with Mitigation	CEQA Significance: No Impact Comparison to Proposed Project: Less Impact (Avoid)	CEQA Significance: Less than Significant with Mitigation Comparison to Proposed Project: Similar Impact	CEQA Significance: Less than Significant with Mitigation Comparison to Proposed Project: Greater Impact	CEQA Significance: Potentially Significant Comparison to Proposed Project: Greater Impact

Table ES-2. Comparison of Alternative Impacts to Proposed Project

Environmental Issue Area	Proposed Project	Alternative 1: No Project/No Development	Alternative 2: Development within Renewable Energy Overlay Zone – Agricultural Lands	Alternative 3: Development within Renewable Energy Overlay Zone – Desert Lands	Alternative 4: Distributed Commercial and Industrial Rooftop Solar Only Alternative
Cultural Resources	Less than	CEQA Significance:	CEQA Significance:	CEQA Significance:	CEQA Significance:
	Significant with Mitigation	No Impact	Potentially Significant	Potentially Significant	Potentially Significant
		Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:
		Less Impact (Avoid)	Greater Impact	Greater Impact	Greater Impact
Geology and Soils	Less than	CEQA Significance:	CEQA Significance:	CEQA Significance:	CEQA Significance:
	Significant with Mitigation	No Impact	Less than Significant with Mitigation	Less than Significant with Mitigation	Less than Significant with Mitigation
		Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:
		Less Impact (Avoid)	Similar Impact	Similar Impact	Similar Impact
GHG Emissions	Less than	CEQA Significance:	CEQA Significance:	CEQA Significance:	CEQA Significance:
	Significant	No Impact	Less than Significant	Less than Significant	Less than Significant
		Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:
		Less Impact	Similar Impact	Similar Impact	Similar Impact
Hazards and	Less than	CEQA Significance:	CEQA Significance:	CEQA Significance:	CEQA Significance:
Hazardous Materials	Hazardous Significant	No Impact	Less than Significant	Less than Significant	Less than Significant
		Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:
		Less Impact	Similar Impact	Similar Impact	Similar Impact

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Table ES-2. Comparison of Alternative Impacts to Proposed Project

Environmental Issue Area	Proposed Project	Alternative 1: No Project/No Development	Alternative 2: Development within Renewable Energy Overlay Zone – Agricultural Lands	Alternative 3: Development within Renewable Energy Overlay Zone – Desert Lands	Alternative 4: Distributed Commercial and Industrial Rooftop Solar Only Alternative
Hydrology/ Water	Less than	CEQA Significance:	CEQA Significance:	CEQA Significance:	CEQA Significance:
Quality	Significant with Mitigation	No Impact	Less than Significant with Mitigation	Potentially Significant	Less than Significant with Mitigation
		Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:
		Less Impact (Avoid)	Greater Impact	Greater Impact	Less Impact
Land Use/Planning	Less than	CEQA Significance:	CEQA Significance:	CEQA Significance:	CEQA Significance:
	Significant	No Impact	Less than Significant	Less than Significant	Less than Significant
		Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:
		Similar Impact	Similar Impact	Similar Impact	Similar Impact
Public Services	Less than	CEQA Significance:	CEQA Significance:	CEQA Significance:	CEQA Significance:
	Significant	No Impact	Less than Significant	Less than Significant	Less than Significant
		Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:
		Less Impact	Similar Impact	Similar Impact	Similar Impact
Transportation	Less than	CEQA Significance:	CEQA Significance:	CEQA Significance:	CEQA Significance:
	Significant	No Impact	Less than Significant	Less than Significant	Less than Significant
		Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:
		Less Impact	Similar Impact	Similar Impact	Similar Impact

Table ES-2. Comparison of Alternative Impacts to Proposed Project

Environmental Issue Area	Proposed Project	Alternative 1: No Project/No Development	Alternative 2: Development within Renewable Energy Overlay Zone – Agricultural Lands	Alternative 3: Development within Renewable Energy Overlay Zone – Desert Lands	Alternative 4: Distributed Commercial and Industrial Rooftop Solar Only Alternative
Tribal Cultural Resources	Less than Significant	CEQA Significance:	CEQA Significance:	CEQA Significance:	CEQA Significance:
		No Impact	Potentially Significant	Potentially Significant	Potentially Significant
		Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:
		Similar Impact	Greater Impact	Greater Impact	Greater Impact
Utilities/Service Systems	Less than Significant	CEQA Significance:	CEQA Significance:	CEQA Significance:	CEQA Significance:
		No Impact	Less than Significant	Less than Significant	Less than Significant
		Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:
		Less Impact	Similar Impact	Greater Impact	Greater Impact

Notes:

CEQA=California Environmental Quality Act; GHG=greenhouse gas

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1 Introduction

This environmental impact report (EIR) has been prepared to meet the requirements of the California Environmental Quality Act (CEQA) for purposes of evaluating the potential environmental impacts, mitigation measures, and alternatives associated with the proposed Brawley Solar Energy Facility Project. This EIR describes the existing environment that would be affected by, and the environmental impacts which could potentially result from the construction and operation of the proposed project as described in detail in Chapter 2.0 of this EIR.

1.1 Overview of the Proposed Project

The project site is located on approximately 227 acres of privately-owned land in the unincorporated area of Imperial County, California. The site is approximately one mile north from the City of Brawley's jurisdictional limit. The project site is south of Baughman Road, west of North (N) Best Avenue, and north of Andre Road. The City of Brawley Wastewater Treatment Plant is located along the western edge of the project site.

The proposed project involves the construction and operation of a 40 megawatt (MW) photovoltaic (PV) solar facility with an integrated 40 MW battery storage system (BESS) (not to exceed 80 MW) on approximately 227 acres of privately-owned land. The proposed project would be comprised of bifacial solar PV arrays panels, an on-site substation, BESS system, fiberoptic line or microwave tower, inverters, transformers, underground electrical cables and access roads. The proposed project would connect to the existing North Brawley Geothermal Power Plant substation located southwest of the project site via an approximately 1.8-mile long aboveground 92 kilovolt generation tie line.

1.1.1 Agency Roles and Responsibilities

This section identifies and summarizes federal, state, and local laws, policies, and regulations that are applicable to the project.

County of Imperial

Implementation of the project would involve the following approvals by the County of Imperial:

- 1. General Plan Amendment. An amendment to the County's General Plan, Renewable Energy and Transmission Element is required to implement the proposed project. CUP applications proposed for specific renewable energy projects not located in the RE Overlay Zone would not be allowed without an amendment to the RE Overlay Zone. The northern portion of the project site (APNs 037-140-020 and 037-140-021) is located within the Geothermal Overlay Zone, which is considered as part of the RE Overlay Zone. However, the entire-southern parcels of the project site (APNs 037-140-020, 037-140-021, 037-140-022, 037-140-023, and 037-140-006) isare located adjacent to, but outside of the RE Overlay Zone. Therefore, the applicant is requesting a General Plan Amendment to include/classify the southern three all five-project parcels into the RE Overlay Zone, so that the entire site would be located within the RE Overlay Zone. No change in the underlying General Plan land use (Agriculture) is proposed.
- Zone Change. The project site is currently zoned General Agricultural with a Geothermal Overlay (A-2-G). The applicant is requesting a Zone Change to include/classify all five project parcels into the Renewable Energy/Geothermal (REG) Overlay Zone (A-2-REG).

- 3. Approval of CUP. Implementation of the project would require the approval of a CUP by the County to allow for the construction and operation of the proposed solar energy facility with an integrated battery storage system. The project site is located on five privately-owned legal parcels zoned General Agricultural with a Geothermal Overlay (A-2-G). With approval of the zone change, the project site would be zoned General Agricultural with a REG Overlay Zone (A-2-REG). Pursuant to Title 9, Division 5, Chapter 8, the following uses are permitted in the A-2 zone subject to approval of a CUP from Imperial County: solar energy electrical generator, battery storage facility, electrical substations, communication towers, and facilities for the transmission of electrical energy.
- 4. **Certification of the EIR.** After the required public review for the Draft EIR, the County will respond to written comments, edit the document, and produce a Final EIR to be certified by the Planning Commission and Board of Supervisors prior to making a decision on approval or denial of the project.

Subsequent ministerial approvals may include, but are not limited to:

- · Grading and clearing permits
- Building permits
- Reclamation plan
- Encroachment permits
- Transportation permit(s)

Other Agencies Reviews and/or Consultations

The following agencies may be involved in reviewing and/or consultations with the project proponent as it relates to construction of the project:

Federal

UNITED STATES FISH AND WILDLIFE SERVICE

• The United States Fish and Wildlife Service (USFWS) enforces compliance with regulations related to special-status species or their habitat as required under the Federal Endangered Species Act (ESA).

UNITED STATES ARMY CORPS OF ENGINEERS

• Section 404 Permit (Clean Water Act [CWA]). The CWA establishes a program to regulate the discharge of dredge and fill material into waters of the U.S. including wetlands. Activities regulated under this program include fills for development, water resource projects (e.g., dams and levees), infrastructure development (e.g., highways and airports), and conversion of wetlands to uplands for farming and forestry. Either an individual 404b permit or authorization to use an existing United States Army Corps of Engineers (USACE) Nationwide Permit will need to be obtained if any portion of the construction requires fill into a river, stream, or stream bed that has been determined to be a jurisdictional waterway.

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State

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE (TRUSTEE AGENCY)

 The California Department of Fish and Wildlife (CDFW) is a Trustee Agency and enforces compliance with regulations related to California special-status species or their habitats as required under the California Endangered Species Act (CESA).

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

- National Pollution Discharge Elimination System Construction General Permit Order No. 2009-009-DWQ. Requires the applicant to file a public Notice of Intent to discharge stormwater and to prepare and implement a stormwater pollution prevention plan (SWPPP).
- Jurisdictional Waters. Agencies and/or project proponents must consultant with the California Regional Water Quality Control Board (RWQCB) regarding, when applicable, regarding compliance with the CWA Section 401 Water Quality Certification or permitting under California Porter-Cologne Act.

Local

IMPERIAL COUNTY FIRE DEPARTMENT

Review as part of the EIR process including the final design of the proposed fire system.

IMPERIAL COUNTY AIR POLLUTION CONTROL DISTRICT

 Review as part of the EIR process regarding consistency with the Imperial County Air Pollution Control District (ICAPCD) CEQA Air Quality Handbook, the final "Modified" 2009 8-hour Ozone Air Quality Management Plan, the State Implementation Plan for particulate matter less than 10 microns in diameter (PM₁₀) in the Imperial Valley, the State Implementation Plan (SIP) for particulate matter less than 2.5 microns in diameter (PM_{2.5}), and verification of Rule 801 compliance.

1.2 Relationship to Statutes, Regulations, and Other Plans

1.2.1 County of Imperial General Plan and Land Use Ordinance

The General Plan provides guidance on future growth in the County of Imperial. Any development in the County of Imperial must be consistent with the General Plan and Land Use Ordinance (Title 9, Division 10).

1.2.2 Renewables Portfolio Standard Program

Established in 2002 under Senate Bill (SB) 1078, California's Renewables Portfolio Standard (RPS) was accelerated in 2006 under SB 107 by requiring that 20 percent of electricity retail sales be served by RE resources by 2010. RE sources include wind, geothermal, and solar. Subsequent recommendations in California energy policy reports advocated a goal of 33 percent by 2020. On November 17, 2008, Governor Arnold Schwarzenegger signed Executive Order (EO) S-14-08 requiring that "... all retail sellers of electricity shall serve 33 percent of their load with RE by 2020." The following year, EO S-21-09 directed the California Air Resources Board (CARB), under its

Assembly Bill (AB) 32 authority, to enact regulations to achieve the goal of 33 percent renewables by 2020.

In the ongoing effort to codify the ambitious 33 percent by 2020 goal, SB X12 was signed by Governor Brown, in April 2011. This new RPS preempts the CARB's 33 percent Renewable Electricity Standard and applies to all electricity retailers in the state including publicly owned utilities, investor-owned utilities, electricity service providers, and community choice aggregators. All of these entities had to adopt the new RPS goals of 20 percent of retails sales from renewables by the end of 2013, 25 percent by the end of 2016, and the 33 percent requirement being met by the end of 2020.

Governor Brown signed into legislation SB 350 in October 2015, which requires retail sellers and publicly owned utilities to procure 50 percent of their electricity from eligible RE resources by 2030. In 2018, SB 100 was signed by Governor Brown, codifying a goal of 60 percent renewable procurement by 2030 and 100 percent by 2045 Renewables Portfolio Standard.

1.2.3 Senate Bill 32

In August 2016, Governor Brown signed SB 32 and AB 197, which serve to extend California's GHG reduction programs beyond 2020. SB 32 amended the Health and Safety Code to include § 38566, which contains language to authorize CARB to achieve a statewide GHG emission reduction of at least 40 percent below 1990 levels by no later than December 31, 2030. SB 32 codified the targets established by EO B-30-15 for 2030, which set the next interim step in the State's continuing efforts to pursue the long-term target expressed in EOs S-3-05 and B-30-15 of 80 percent below 1990 emissions levels by 2050.

1.2.4 Title 17 California Code of Regulations, Subchapter 10, Article 2, Sections 95100 et seq.

These CARB regulations implement mandatory GHG emissions reporting as part of the California Global Warming Solutions Act of 2006.

1.2.5 Federal Clean Air Act

The legal authority for federal programs regarding air pollution control is based on the 1990 Clean Air Act (CAA) Amendments. These are the latest in a series of amendments made to the CAA. This legislation modified and extended federal legal authority provided by the earlier Clean Air Acts of 1963 1970, and 1977.

The Air Pollution Control Act of 1955 was the first Federal legislation involving air pollution. This Act provided funds for federal research in air pollution. The CAA of 1963 was the first Federal legislation regarding air pollution control. It established a federal program within the U.S. Public Health Service and authorized research into techniques for monitoring and controlling air pollution. In 1967, the Air Quality Act was enacted in order to expand Federal government activities. In accordance with this law, enforcement proceedings were initiated in areas subject to interstate air pollution transport. As part of these proceedings, the Federal government for the first time conducted extensive ambient monitoring studies and stationary source inspections.

The Air Quality Act of 1967 also authorized expanded studies of air pollutant emission inventories, ambient monitoring techniques, and control techniques.

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1.2.6 Imperial County Air Pollution Control District

The ICAPCD enforces rules and regulations regarding air emissions associated with various activities, including construction and farming, and operational activities associated with various land uses, in order to protect the public health.

1.2.7 Federal Clean Water Act (33 United States Code Section 1251-1387)

The Federal Water Pollution Control Act (33 United States Code [USC] §§1251-1387), otherwise known as the CWA, is a comprehensive statute aimed at restoring and maintaining the chemical, physical and biological integrity of the nation's waters. Enacted originally in 1948, the Act was amended numerous times until it was reorganized and expanded in 1972. It continues to be amended almost every year. Primary authority for the implementation and enforcement of the CWA rests with the U.S. Environmental Protection Agency (EPA). In addition to the measures authorized before 1972, the Act authorizes water quality programs, requires federal effluent limitations and state water quality standards, requires permits for the discharge of pollutants into navigable waters, provides enforcement mechanisms, and authorizes funding for wastewater treatment works construction grants and state revolving loan programs, as well as funding to states and tribes for their water quality programs. Provisions have also been added to address water quality problems in specific regions and specific waterways.

Important for wildlife protection purposes are the provisions requiring permits to dispose of dredged and fill materials into navigable waters. Permits are issued by the USACE under guidelines developed by EPA pursuant to Section 404 of the CWA.

1.2.8 Federal Clean Water Act and California Porter-Cologne Water Quality Control Act

The project is located within the Colorado River Basin RWQCB, Region 7. The CWA and the California Porter-Cologne Water Quality Control Act require that Water Quality Control Plans (more commonly referred to as Basin Plans) be prepared for the nine state-designated hydrologic basins in California. The Basin Plan serves to guide and coordinate the management of water quality within the region.

1.2.9 Federal Endangered Species Act

The ESA (16 USC 1531-1544) provides protection for plants and animals whose populations are dwindling to levels that are no longer sustainable in the wild. The Act sets out a process for listing species, which allows for petition from any party to list a plant or animal. Depending on the species, USFWS or the National Marine Fisheries Service (NMFS) will determine whether listing the species is warranted. If it is warranted, the species will be listed as either threatened or endangered. The difference between the two categories is one of degree, with endangered species receiving more protections under the statute.

1.2.10 National Historic Preservation Act

Federal regulations (36 Code of Federal Regulations [CFR] Part 800.2) define historic properties as "any prehistoric or historic district, site, building, structure, or object included, or eligible for inclusion in, in the National Register of Historic Places (NRHP)." The term "cultural resource" is used to denote

a historic or prehistoric district, site, building, structure, or object, regardless of whether it is eligible for the NRHP.

1.2.11 California Endangered Species Act

CESA is enacted through Government Code Section 2050. Section 2080 of the California Fish and Game Code (FGC) prohibits "take" of any species that the commission determines to be an endangered species or a threatened species. Take is defined in Section 86 of the FGC as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill."

CESA allows for take incidental to otherwise lawful development projects. CESA emphasizes early consultation to avoid potential impacts to rare, endangered, and threatened species and to develop appropriate mitigation planning to offset project-caused losses of listed species populations and their essential habitats.

1.2.12 California Lake and Streambed Program (Fish and Game Code Section 1602)

CDFW is responsible for conserving, protecting, and managing California's fish, wildlife, and native plant resources. To meet this responsibility, the FGC (Section 1602) requires an entity to notify CDFW of any proposed activity that may substantially modify a river, stream, or lake.

1.3 Purpose of an EIR

The purpose of an EIR is to analyze the potential environmental impacts associated with a project. CEQA (Section 15002) states that the purpose of CEQA is to: (1) inform the public and governmental decision makers of the potential, significant environmental impacts of a project; (2) identify the ways that environmental damage can be avoided or significantly reduced; (3) prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible; and (4) disclose to the public the reasons why a governmental agency approved the project in the manner the agency chose if significant environmental effects are involved.

1.4 EIR Process

1.4.1 Availability of Reports

This—The Draft EIR has been—was distributed to various federal, state, regional, local agencies and interested parties for a 45-day public review period, from December 27, 2021 through February 10, 2022, in accordance with Section 15087 of the CEQA Guidelines. Theis Draft EIR and documents incorporated by reference are were made available for public review at the County of Imperial Planning and Development Services Department, 801 Main Street, El Centro, California 92243. Documents may be reviewed were available for review during regular business hours.

David Black, Planner IV

County of Imperial, Planning and Development Services Department

801 Main Street

El Centro, California 92243

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Comments received during the public review period of the Draft EIR will be have been reviewed and responded to in the this Final EIR. The Final EIR will then be reviewed by the Imperial County Planning Commission and Board of Supervisors as a part of the procedure to adopt the EIR. Additional information on this process may be obtained by contacting the County of Imperial Planning and Development Services Department at (442) 265-1736.

1.4.2 Public Participation Opportunities/Comments and Coordination

Notice of Preparation

The County of Imperial issued a notice of preparation (NOP) for the preparation of an EIR for the Brawley Solar Energy Facility Project on July 26, 2021. The NOP was distributed to city, county, state, and federal agencies, other public agencies, and various interested private organizations and individuals in order to define the scope of the EIR. The NOP was also published in the Imperial Valley Press on July 25, 2021. The purpose of the NOP was to identify public agency and public concerns regarding the potential impacts of the project, and the scope and content of environmental issues to be addressed in the EIR. Correspondence in response to the NOP was received from the following entities and persons:

- Native American Heritage Commission
- California Department of Conservation
- Imperial Irrigation District
- Imperial County Air Pollution Control District
- Carolyn Allen and on behalf of Donna Tisdale, Members of BackCountry Against Dumps and Donbee Farms
- Carolyn Allen and on behalf of Donna Tisdale, Larry Cox, and Michael Cox, Donbee Farms and Backcountry Against Dumps
- Donna Tisdale, Michael Cox, Carolyn Allen, Lawrence Cox; C/O Donbee Farms

The comments submitted on the NOP during the public review and comment period are included as Appendix A to this EIR.

Scoping Meeting and Environmental Evaluation Committee

During the NOP public review period, the Brawley Solar Energy Facility Project was discussed as an informational item at the County's Environmental Evaluation Committee meeting on August 12, 2021.

Additionally, a virtual scoping meeting for the general public as well public agencies was held on August 12, 2021 at 6:00 p.m., to further obtain input as to the scope of environmental issues to be examined in the EIR. The NOP, which included the scoping meeting date and location, was published in the Imperial Valley Press on July 26, 2021. A virtual meeting was held by the Imperial County Planning & Development Services Department. At the scoping meeting, members of the public were invited to ask questions regarding the proposed project and the environmental review process, and to comment both verbally and in writing on the scope and content of the EIR. One comment letter was received during the scoping meeting.

1.4.3 Environmental Topics Addressed

Based on the analysis presented in the NOP and the information provided in the comments to the NOP, the following environmental topics are analyzed in this EIR:

- Aesthetics
- Agriculture Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Geology and Soils
- GHG Emissions
- Hazards and Hazardous Materials
- Hydrology/Water Quality
- Land Use/Planning
- Public Services (Fire Protection and Police Protection)
- Transportation
- Tribal Cultural Resources
- Utilities/Service Systems (Water Supply)

Eliminated from Further Review in Notice of Preparation

The Initial Study (IS)/NOP completed by the County (Appendix A of this EIR) determined that environmental effects to Forestry Resources, Energy, Mineral Resources, Noise, Population/Housing, Public Services, Recreation, Utilities (Wastewater, Stormwater, and Solid Waste), and Wildfire would not be potentially significant. Therefore, these impacts are not addressed in this EIR; however, the rationale for eliminating these issues is discussed in Chapter 6.0, Effects Found Not Significant.

1.4.4 Areas of Controversy and Issues to be Resolved

Section 15123(b)(2) of the CEQA Guidelines requires that an EIR identify areas of controversy known to the Lead Agency, including issues raised by other agencies and the public as well as issues to be resolved. A primary issue associated with this solar farm project, and other solar facility projects that are proposed in the County, is the corresponding land use compatibility and fiscal/economic impacts to the County. Through the environmental review process for this project, other areas of concern and issues to be resolved include potential impacts related to the conversion of farmland to non-agricultural uses, damage to crops, wildlife, water supply, fire hazards associated with the battery energy storage system, health effects from air pollution, noise, and hazardous materials, waste, electromagnetic exposure safety, and change of visual character.

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1.4.5 Document Organization

The structure of the <u>Draft-Final_EIR</u> is identified below. The <u>Draft-Final_EIR</u> is organized into <u>40-14</u> chapters, including the Executive Summary.

- Chapter 0.1 Introduction and Summary describes the CEQA requirements and content of the Final EIR.
- Chapter 0.2 Responses to Comment Letters Received on the Draft EIR provides copies of the comment letters received and individual responses to written comments.
- Chapter 0.3 Errata to the Draft EIR identifies the location of, or contains revisions to, information included in the Draft EIR dated December 2021, based upon additional or revised information required to prepare a response to a specific comment.
- Chapter 0.4 Mitigation Monitoring and Reporting Program identifies the mitigation measures, timing, and responsibility for implementation of the measures.
- The **Executive Summary** provides a summary of the proposed project, including a summary of project impacts, mitigation measures, and project alternatives.
- Chapter 1 Introduction provides a brief introduction of the proposed project; relationship to statutes, regulations and other plans; the purpose of an EIR; public participation opportunities; availability of reports; and comments received on the NOP.
- Chapter 2 Project Description provides a description of the Brawley Solar Energy Facility Project. This chapter also defines the goals and objectives of the proposed project, provides details regarding the individual components that together comprise the project, and identifies the discretionary approvals required for implementation of the project.
- Chapter 3 Environmental Analysis provides a description of the existing environmental
 setting and conditions, an analysis of the environmental impacts of the project for the following
 environmental issues: aesthetics; air quality; biological resources; cultural resources (includes
 tribal cultural resources); geology and soils; GHG emissions; hydrology/water quality; land use
 and planning; transportation/traffic; and utilities/service systems. This chapter also identifies
 mitigation measures to address potential impacts to the environmental issues identified above.
- Chapter 4 Analysis of Long-Term Effects provides an analysis of growth inducing impacts, significant irreversible environmental changes, and unavoidable adverse impacts.
- Chapter 5 Cumulative Impacts discusses the impact of the proposed project in conjunction with other planned and future development in the surrounding areas.
- Chapter 6 Effects Found Not to be Significant lists all the issues determined to not be significant as a result of the preparation of this EIR.
- Chapter 7 Alternatives analyzes the alternatives to the proposed project.
- Chapter 8 References lists the data references utilized in preparation of the EIR.
- Chapter 9 EIR Preparers and Organizations Contacted lists all the individuals and companies involved in the preparation of the EIR, as well as the individuals and agencies consulted and cited in the EIR.

1 Introduction Final EIR | Brawley Solar Energy Facility Project

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2 Project Description

Chapter 2 provides a description of the Brawley Solar Energy Facility Project. This chapter also defines the goals and objectives of the proposed project, provides details regarding the individual components that together comprise the project, and identifies the discretionary approvals required for project implementation.

The proposed project consists of three primary components: 1) solar energy generation equipment and associated facilities including a substation and access roads (herein referred to as "solar energy facility"); 2) battery energy storage system; and, 3) gen-tie line that would connect the proposed on-site substation to the point of interconnection at the existing North Brawley Geothermal Power Plant substation. The solar energy facility, battery energy storage system and gen-tie are collectively referred to as the "proposed project" or "project."

2.1 Project Location

The project site is located on approximately 227 acres of privately-owned land in the unincorporated area of Imperial County, California (Figure 2-1). The site is approximately one mile north from the City of Brawley's jurisdictional limit. The project site is south of Baughman Road, west of North (N) Best Avenue, and north of Andre Road. The Union Pacific Railway transects the project site. As shown on Figure 2-2, the project site is proposed on five parcels. Table 2-1 identifies the individual assessor parcel numbers (APN) with their respective acreage and zoning.

As shown on Figure 2-2, the gen-tie line would originate from the southern edge of the project site and then head west along Andre Road to interconnect to the IID existing North Brawley Geothermal Power Plant substation, located at Hovley Road and Andre Road. The gen-tie route would be approximately 1.8 miles.

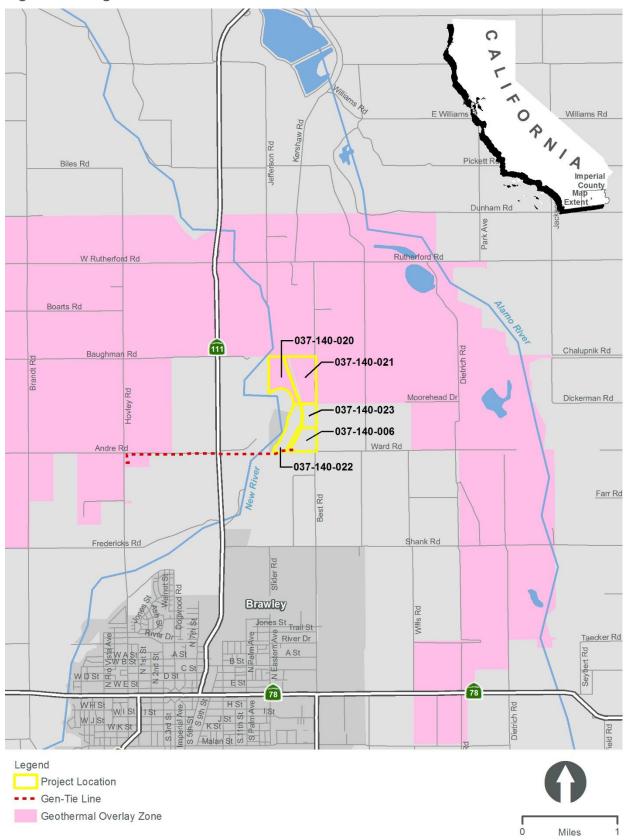
Currently, the project site contains alfalfa fields within different levels of harvest. North and east of the project site is undeveloped agricultural land. South of the project site is a mixture of undeveloped agricultural land and dirt lots used for staging activities. The Del Rio Country Club golf course is located to the south of the site. The City of Brawley Wastewater Treatment Plant (WWTP) is located along the western edge of the project site.

Table 2-1. Project Assessor Parcel Numbers, Acreages, and Zoning

APN	Acreage	Zoning
037-140-020	61.73	A-2-G
037-140-021	68.71	A-2-G
037-140-022	38.15	A-2-G
037-140-023	24.71	A-2-G
037-140-006	33.68	A-2-G
Total Gross Acres	227	

APN = assessor parcel number; A-2-G = General Agricultural with Geothermal Overlay

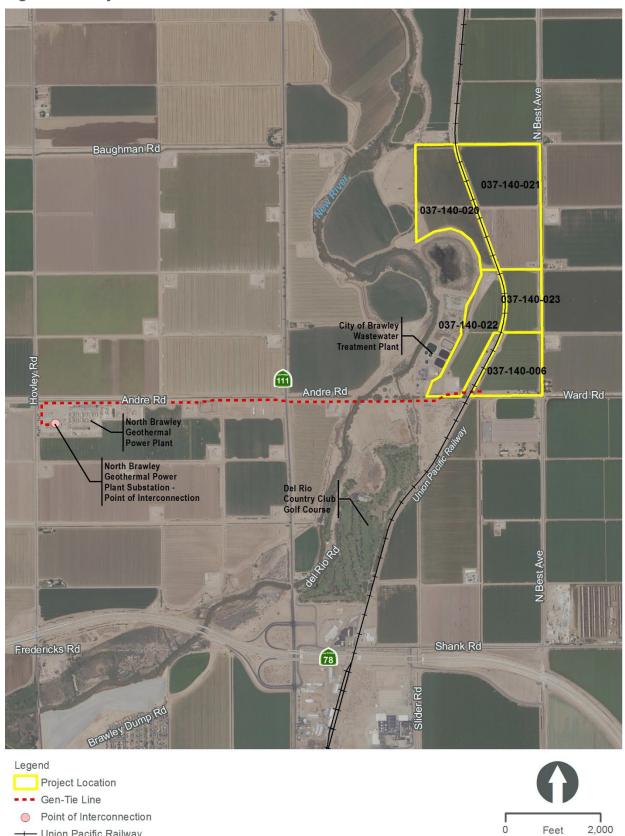
Figure 2-1. Regional Location



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Figure 2-2. Project Site

--- Union Pacific Railway



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2.1.1 Renewable Energy Overlay Zone

In 2016, the County adopted the Imperial County Renewable Energy and Transmission Element, which includes an RE Zone (RE Overlay Map). This General Plan element was created as part of the California Energy Commission Renewable Energy Grant Program to amend and update the County's General Plan to facilitate future development of renewable energy projects.

The County Land Use Ordinance, Division 17, includes the RE Overlay Zone, which authorizes the development and operation of renewable energy projects with an approved CUP. The RE Overlay Zone is concentrated in areas determined to be the most suitable for the development of renewable energy facilities while minimizing the impact on other established uses. CUP applications proposed for specific renewable energy projects not located in the RE Overlay Zone would not be allowed without an amendment to the RE Overlay Zone.

As shown on Figure 2-1, the northern portion of the project site (APNs 037-140-020 and 037-140-021) is located within the Geothermal Overlay Zone, which is considered as part of the RE Overlay Zone. However, the entire-southern parcels of the project site (APNs 037-140-020, 037-140-021, 037-140-022, 037-140-023, and 037-140-006) is are located adjacent to, but outside of the RE Overlay Zone. Therefore, the applicant is requesting a General Plan Amendment to include/classify all fivethe southern three project parcels into the RE Overlay Zone, so that the entire site would be located within the RE Overlay Zone. No change in the underlying General Plan land use (Agriculture) is proposed.

2.2 Project Objectives

- Construct, operate and maintain an efficient economic, reliable, safe and environmentally sound solar-powered electricity generating facility.
- Help meet California's RPS requirements, which require that by 2030, California's electric
 utilities are to obtain 50 percent of the electricity they supply from renewable sources.
- Generate renewable solar-generated electricity from proven technology, at a competitive cost, with low environmental impact, and deliver it to markets as soon as possible.
- Develop, construct, own and operate the Brawley Solar Energy Facility, and ultimately sell its
 electricity and all renewable and environmental attributes to an electric utility purchaser under
 a long-term contract to meet California's RPS goals.
- Utilize a location that is in close proximity to an existing switching station and power lines.
- Minimize and mitigate any potential impact to sensitive environmental resources within the project area.

2.3 Project Characteristics

The proposed project involves the construction and operation of a 40 MW PV solar facility with an integrated 40 MW BESS (not to exceed 80 MW) on approximately 227 acres of privately-owned land. The proposed project would be comprised of bifacial solar PV arrays panels, an on-site substation, BESS, generation tie-line (gen-tie), fiberoptic line and or microwave tower, inverters, transformers, underground electrical cables, access roads. These project components are described in detail below and depicted in Figure 2-3.

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Figure 2-3. Site Plan



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2.3.1 Photovoltaic Panels/Solar Arrays

Solar cells, also called PV cells, convert sunlight directly into electricity. PV cells combine to create solar modules, or panels, and many solar panels combined together to create one system is called a solar (or PV) array. The entire array would utilize 13 inverters and transformers collectively called a Power Conversion Station (PCS) for each block of solar panels. The inverters within the PCS are rated at 3496 kV amperes (KVA). The power produced from the solar panels would be low voltage DC, which is routed to the inverters to convert the DC power to alternating current (AC).

The proposed project's PV arrays would be comprised of solar bifacial high-power dual cell PV panels. Panels would be organized into electrical groups referred to as "blocks," where the proposed project would require 13 blocks. Each panel is 3.2 feet by 6.5 feet and is on single-axis horizontal trackers in blocks that each hold 3,809 PV panels in 28 strings. The panels would be oriented from east to west for maximum exposure and the foundation would be designed based on soil conditions. The PV panels are made of a poly-crystalline silicon semiconductor material encapsulated in glass.

Installation of the PV arrays would include installation of mounting posts, module rail assemblies, PV modules, inverters, transformers and buried electrical conductors. Concrete would be required for the footings, foundations and pads for the transformers and substation work. Tracker foundations would be comprised of either driven or vibrated steel posts/pipes, and/or concrete in some places (depending on soil and underground conditions).

2.3.2 Battery Energy Storage System

The proposed project's BESS component would be placed on a 54,000 square-foot concrete pad at the southern edge of the project site. The BESS would consist of 12 banks of batteries totaling up to 432 enclosures. Each bank of batteries would be supported by a DC Combiner, control panel, and inverter/transformer skid. Each of the enclosures would utilize self-contained liquid cooling systems and include built-in fire suppression systems. All batteries would be lithium-ion based capable of storing 40 MW (not to exceed 80 MW).

A lithium-ion battery is a type of rechargeable battery that moves from the negative electrode through an electrolyte to the positive electrode during discharge, and back when charging. Lithium-ion batteries use an intercalated lithium compound as the material at the positive electrode and typically graphite at the negative electrode. The batteries have a high energy density, no memory effect and low self-discharge. Lithium-ion batteries would be mounted in racks. These racks would be integrated into containers. Lithium-ion battery racks sit side-by-side and typically have 48 inches of spacing in front of the rack and 18 inches of spacing in the rear of the rack. Spacing may be increased for serviceability. The project design would meet minimum spacing required by code.

2.3.3 Substation

The proposed substation would be a new 92/12 kV unstaffed, automated, low-profile substation. The dimensions of the fenced substation would be approximately 300 feet by 175 feet, with the footprint encompassing approximately 1.2 acres. The tallest feature would be the dead-end portal structure (39 feet 6 inches) coming in off the gen-tie line, which would have a lighting mast attached, making it 54 feet 6 inches total. The onsite substation control room would house the SCADA system, switchgear, breakers, and DC batteries. Additionally, a 20kV emergency backup generator would be located adjacent to this control room for the HVAC system. The proposed substation site would be located at

the southern edge of the project site, adjacent to the BESS. The California Building Code and the IEEE 693, Recommended Practices for Seismic Design of Substations, will be followed for the substation's design, structures, and equipment.

2.3.4 Gen-Tie Line

The proposed project would connect to a switchyard located at the southern edge of the project site and then routed through the BESS for energy storage. Power would then be transferred via a 1.8-mile-long double circuit 13.8 and 92 kV gen-tie line with 66- foot-high poles to interconnect to the IID' existing North Brawley Geothermal Power Plant substation, located at Hovley Road and Andre Road, southwest of the project site. The transmission line would span the New River. A 12-inch diameter conduit railroad undercrossing would connect the PV arrays from the western side of the railroad tracks to the inverters on the eastern side.

The maximum height limit for non-residential structures and commercial communication towers in the A-2 zone is 120 feet. The proposed project's 66-foot-high gen-tie poles would not exceed the height limit in the A-2 zone.

2.3.5 Fiberoptic Cable and or Microwave Tower

A proposed fiberoptic line from the project substation would be connected with the existing North Brawley Geothermal Power Plant substation approximately 1.8 miles to the southwest, which is required to connect the project substation to the region's telecommunications system. Overall, this would provide SCADA, protective relaying, data transmission, and telephone services for the proposed project substation and associated facilities. New telecommunications equipment would be installed at the project substation within the unmanned Mechanical and Electrical Equipment Room (MEER). The proposed fiber optic telecommunications cable, once past the point of interconnection, would utilize existing transmission lines to connect to the existing North Brawley Geothermal Power Plant substation. The length of this proposed fiber optic telecommunications cable route would be approximately 1.8 miles. Alternatively, a 40 to 100-feet tall microwave tower could replace the need for a fiberoptic line to transmit data offsite. If selected, this microwave tower would be located within the project substation footprint. The maximum height limit for non-residential structures and commercial communication towers in the A-2 zone is 120 feet. The proposed 40 to 100-feet tall microwave tower would not exceed the height limit in the A-2 zone.

2.3.6 Security

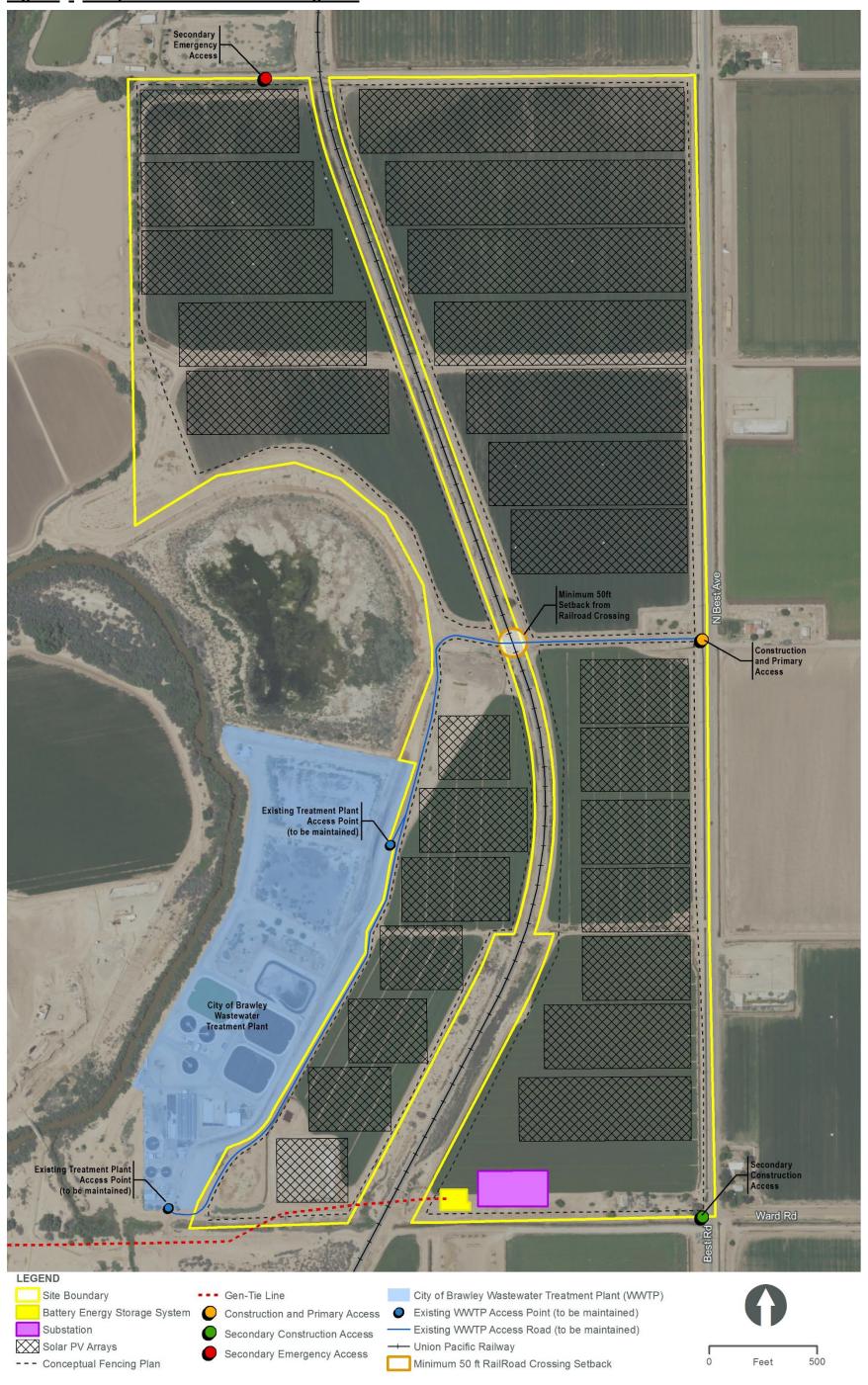
Six-foot high chain link fencing topped with barbed wire would be installed around the perimeter of the project site at the commencement of construction and site access would be limited to authorized site workers. Figure 2-4 shows the project's conceptual fencing plan. Points of ingress/egress would be accessed via locked gates. In addition, a motion detection system and closed-circuit camera system may also be installed. The site would be remotely monitored 24 hours per day, 7 days per week. In addition, routine unscheduled security rounds may be made by the security team monitoring the site security.

The City of Brawley WWTP is located along the western edge of the project site. Access to a portion of the WWTP is facilitated through an easement that was granted in 2007. The easement applies to the portion of the access road that runs in an easterly/westerly direction from N Best Road. The City

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relies upon the unimproved road continuing from the easement to the south/southwest to provide staff access to the WWTP, allow for vacuum trucks to transport wastewater to the facility and to transport solids generated by the WWTP to licensed Class I landfills, and provide access for heavy vehicles/equipment for materials delivery, maintenance repair and system upgrade purposes. As shown on Figure 2-4, the WWTP's access road and access points are located outside of the proposed project's fence. The proposed project would be constructed so as to not interfere with the WWTP's existing access.

Figure 2-4. Proposed Access and Fencing Plan



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2.3.7 Site Access

As shown in <u>Figure 2-4</u>Figure 2-3, primary access to the project site would be located off N Best Avenue. A secondary emergency access road would be located in the northwest portion of the project site. Access roads would be constructed with an all-weather surface, to meet the County Fire Department's standards. Points of ingress/egress would be accessed via locked gates that can be opened by any emergency responders. An all-weather surface access road would surround the perimeter of the project site, as well as around solar blocks no greater than 500 by 500 feet.

2.3.8 Fire Protection/Fire Suppression

Fire protection systems for battery systems would be designed in accordance with California Fire Code and would take into consideration the recommendations of the National Fire Protection Association (NFPA) 855.

Fire suppression agents such as Novec 1230 or FM 2000, or water may be used as a suppressant. In addition, fire prevention methods would be implemented to reduce potential fire risk, including voltage, current, and temperature alarms. Energy storage equipment would comply with Underwriters Laboratory (UL)-95401 and test methods associated with UL-9540A. The project would include lithiumion batteries. For lithium-ion batteries storage, a system would be used that would contain the fire event and encourage suppression through cooling, isolation, and containment. Suppressing a lithiumion (secondary) battery is best accomplished by cooling the burning material. A gaseous fire suppressant agent (e.g., 3M™ Novec™ 1230 Fire Protection Fluid or similar) and an automatic fire extinguishing system with sound and light alarms would be used for lithium-ion batteries.

Water for fire suppression would be obtained from a ground storage tank existing onsite which fills from the Best Canal along the eastern property boundary.

To mitigate potential hazards, redundant separate methods of failure detection would be implemented. These would include alarms from the Battery Management System (BMS), including voltage, current, and temperature alarms. Detection methods for off gas detection would be implemented, as applicable. These are in addition to other potential protective measures such as ventilation, overcurrent protection, battery controls maintaining batteries within designated parameters, temperature and humidity controls, smoke detection, and maintenance in accordance with manufacturer guidelines. Remote alarms would be installed for operations personnel as well as emergency response teams in addition to exterior hazard lighting. In addition, an Incidence Response Plan would be implemented. Additionally, the project applicant would contribute its proportionate share for purchase of any fire-suppression equipment, if determined warranted by the County fire department for the proposed project.

2.4 Project Construction

Construction activities would be sequenced and conducted in a manner that addresses storm water management and soil conservation. During construction, electrical equipment would be placed in service at the completion of each power-block, after the gen-tie line has been completed. The activation of the power-blocks is turned over to interconnection following the installation of transformer and interconnection equipment upgrades. This in-service timing is critical because PV panels can produce power as soon as they are exposed to sunlight, and because the large number of blocks and

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the amount of time needed to commission each block requires commissioning to be integrated closely with construction on a block-by-block basis.

2.4.1 Construction Personnel and Equipment

The proposed project's workforce would consist of laborers, electricians, supervisory personnel, support personnel and construction management personnel. Up to 120 people are expected to be onsite per day. Project laydown and construction staff parking is expected to be located on-site or at the existing North Brawley Geothermal Power Plant in an approximately 4-acre area.

Typical equipment to be used during project construction and commissioning is listed in Table 2-2.

Table 2-2. Construction Equipment

Equipment	Use
1-ton crew trucks	Transport construction personnel
2-ton flatbed trucks; flatbed boom trucks	Haul and unload materials
Mechanic truck	Service and repair equipment
Aerial bucket trucks	Access poles, string conductor, and other uses
Shop vans	Store tools
Bulldozers	Grade pole sites; reclamation
Truck-mounted diggers or backhoes	Excavate
Small mobile cranes (12 tons)	Load and unload materials
Large mobile cranes (75 tons)	Erect structures
Transport	Haul poles and equipment
Drill rigs with augers	Excavate and install fences
Semi tractor-trailers	Haul structures and equipment
Splice trailers	Store splicing supplies
Air compressor	Operate air tools
Air tampers	Compact soil around structure foundations
Concrete trucks	Pour concrete
Dump trucks	Haul excavated materials/import backfill
Fuel and equipment fluid trucks	Refuel and maintain vehicles
Water trucks	Suppress dust and fires

2.4.2 Construction Schedule, Sequence, and Phasing

Construction is anticipated to start in quarter four two of 2021–2023 and would take approximately 6-9 months to complete. Construction would commence only after all required permits and authorizations have been secured. Construction would generally occur during daylight hours, Monday through Friday. However, non-daylight work hours may be necessary to make up schedule deficiencies, or to complete critical construction activities. For example, during hot weather, it may be necessary to start work earlier to avoid pouring concrete during high ambient temperatures. If construction is to occur outside of the County's specified working hours, permission in writing will be sought at the time. The County's construction equipment operation shall be limited to the hours of 7 a.m. to 7 p.m., Monday through

Friday, and 9 a.m. to 5 p.m. on Saturday. No commercial construction operations are permitted on Sunday or holidays.

Construction of the project would occur in phases beginning with site preparation and grading and ending with equipment setup and commencement of commercial operations. Overall, construction would consist of three major phases over a period of approximately 6-9 months.

- Site Preparation (1 month)
- PV System Installation and Testing (7 months)
- Site Clean-Up and Restoration (1 month)

Site Preparation

Project construction would include the renovation of existing dirt roads to all-weather surfaces (to meet the County standards) from N Best Avenue to the City of Brawley wastewater treatment plant. Construction of the proposed project would begin with clearing of existing brush and installation of fencing around the project boundary. Figure 2-4 shows the project's conceptual fencing plan. Fencing would consist of a six-foot chain-link fence topped with barbed wire. A 20-foot road of engineering-approved aggregate would surround the site within the fencing.

Project construction would include the renovation of existing dirt roads within the project site, to all-weather surfaces (to meet the County standards). If agreeable by the City of Brawley, the roadways outside the project site would also be renovated to all-weather surfaces to improve the roadway from N Best Avenue to the City of Brawley WWTP. These improvements would be coordinated with the City of Brawley.

Material and equipment staging areas would be established on-site or at the existing North Brawley Geothermal Power Plant within an approximate 4-acre area. The staging area would include an airconditioned temporary construction office, a first-aid station and other temporary facilities including, but not limited to, sanitary facilities, worker parking, truck loading and unloading, and a designated area for assembling the support structures for the placement of PV modules. The size of the staging area would shrink as construction progresses throughout the project site. The project construction contractor would then survey, clear and grade road corridors in order to bring equipment, materials, and workers to the various areas under construction within the project site. Road corridors buried electrical lines, PV array locations and locations of other facilities may be flagged and staked in order to guide construction activities.

PV System Installation and Testing

PV system installation would include earthwork, grading and erosion control, as well as erection of the PV modules, mounting posts and associated electrical equipment.

The PV modules require a moderately flat surface for installation and therefore some earthwork, including grading, fill, compaction and erosion control, may be required to accommodate the placement of PV arrays, concrete for foundations, access roads and/or drainage features. Construction of the PV arrays would be expected to take place at a rate of approximately 0.10 MW to 0.25 MW per day. Construction of the PV arrays would include installation of the mounting posts, module assemblies, PV modules, inverters, transformers and buried electrical conductors. The module assemblies would then be cut off at the appropriate heights since the center posts must be completely level. Field welding would be required to attach the module assemblies to the top of the mounting posts. Finally, the PV panels would be attached to the module assemblies. Heavy equipment lifters

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(e.g., forklift) would be required to get the module assemblies in position, while welding and cutting equipment would be necessary to cut off the posts at the appropriate height.

Concrete would be required for the footings, foundations and pads for the transformers and substation equipment. Concrete would be produced at an off-site location by a local provider and transported to the site by truck. The PCS housing the inverters utilize a precast concrete base. Final specifications for concrete would be determined during detailed design engineering, but any related production would meet applicable building codes. Wastes generated during construction would be non-hazardous and may contain any of the following: cardboard, wood pallets, copper wire, scrap steel, common trash and wood wire spools, and as much as possible of the waste that is generated during construction would be recycled.

No hazardous waste is expected to be generated during construction of the proposed project. However, field equipment used during construction would contain various hazardous materials such as hydraulic oil, diesel fuel, grease, lubricants, solvents, adhesives, paints and other petroleum-based products contained in most construction vehicles. The storage, handling, and potential spills of these materials contained within the field equipment would adhere to all applicable local, State, and Federal regulations.

Site Clean-Up and Restoration

After construction is complete, all existing roads would be left in a condition equal to or better than their preconstruction condition. All other areas disturbed by construction activities would be recontoured and decompacted.

Waste materials and debris from construction areas would be collected, hauled away, and disposed of at approved landfill sites. Cleared vegetation would be shredded and distributed over the disturbed site as mulch and erosion control or disposed of offsite, depending on agency agreements. Rocks removed during foundation excavation would be redistributed over the disturbed site to resemble adjacent site conditions. Interim reclamation would include also re-contouring of impacted areas to match the surrounding terrain, and cleaning trash out of gullies. Equipment used could include a blader, front-end loader, tractor, and a dozer with a ripper.

A covered portable dumpster would be kept on site to contain any trash that can be blown away. After completion of the proposed project, the project engineer would complete a final walk-through and note any waste material left on site and any ruts or terrain damage or vegetation disturbance that has not been repaired. The construction contractor would be given this list and final payment would not be received until all items are completed.

2.4.3 Water Use

Approximately 20,000 to 30,000 gallons of water per day would initially be required for grading, dropping to much less for the remainder of the project construction. Construction water needs would be limited to earthwork, soil conditioning, dust suppression, compaction efforts, and fire suppression. Water would be obtained from a ground storage tank existing onsite which fills from the Best Canal along the eastern property boundary. A dust palliative with low environmental toxicity would also be used to suppress dust as approved by CARB and the ICAPCD.

Potable water would be brought to the project site for drinking and domestic needs.

2.5 Operations and Maintenance

Once fully constructed, the project would be operated on an unstaffed basis and be monitored remotely, with periodic on-site personnel visitations for security, maintenance and system monitoring. Therefore, no full-time site personnel would be required on-site during operations and approximately two employees would only be onsite up to four times per year to wash the solar panels. As the project's PV arrays produce electricity passively, maintenance requirements are anticipated to be very minimal. Any required planned maintenance activities would generally consist of equipment inspection and replacement and would be scheduled to avoid peak load periods. Any unplanned maintenance would be responded to as needed, depending on the event.

Operation of the proposed project would require upgrades including but not limited to relay upgrades, Phasor Measurement Unit Requirements, Relay, SCADA, Metering and Telecom upgrades at both the proposed substation and North Brawley Geothermal Power Plant substation. The construction and operation of these upgrades by IID required to adequately operate the project are included as part of the project and project analysis.

2.5.1 Water Use

Estimated annual water consumption for operation and maintenance of the proposed project, including periodic PV module washing and fire suppression, would be approximately 3.1-acre feet per year (AFY), which would be supplied to the project site via the adjacent Best Canal and trucked to the project site as needed.

2.6 Restoration of the Project Site

Electricity generated by the facility could be sold under the terms of a power purchase agreement (PPA) with a power purchaser (i.e., utility service provider). At the end of the PPA term, the owner of the facility may choose to enter into a subsequent PPA, update technology and re-commission, or decommission and remove the generating facility and its components. Solar equipment has a lifespan of approximatey 20 to 25 years, and with recent technology can have a lifespan of up to 30 years. Upon decommissioning, the site could be converted to other uses in accordance with applicable land use regulations in effect at that time. A collection and recycling program will be executed to promote recycling of project components and minimize disposal in landfills. All permits related to decommissioning would be obtained, where required.

Project decommissioning may include the following activities:

- The facility would be disconnected from the utility power grid.
- Project components would be dismantled and removed using conventional construction equipment and recycled or disposed of safely.
- PV panel support steel and support posts would be removed and recycled off-site by an approved metals recycler.
- All compacted surfaces within the project site and temporary on-site haul roads would be decompacted.
- Electrical and electronic devices, including inverters, transformers, panels, support structures, lighting fixtures, and their protective shelters would be recycled off-site by an approved recycler.

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- All concrete used for the underground distribution system would be recycled off-site by a concrete recycler or crushed on-site and used as fill material.
- Fencing would be removed and recycled off-site by an approved metals recycler.
- Gravel roads would be removed; filter fabric would be bundled and disposed of in accordance with all applicable regulations. Road areas would be backfilled and restored to their natural contour.
- Soil erosion and sedimentation control measures would be re-implemented during the decommissioning period and until the site is stabilized.

2.7 Required Project Approvals

2.7.1 Imperial County

The following are the primary discretionary approvals required for implementation of the project:

- 1. **General Plan Amendment.** An amendment to the County's General Plan Renewable Energy and Transmission Element is required to implement the proposed project. CUP applications proposed for specific renewable energy projects not located in the RE Overlay Zone would not be allowed without an amendment to the RE Overlay Zone. As shown in Figure 2-1, the northern portion of the project site (APNs 037-140-020 and 037-140-021) is located within the Geothermal Overlay Zone, which is considered as part of the RE Overlay Zone. However, the entire—southern parcels of the project site (APNs 037-140-020, 037-140-021, 037-140-022, 037-140-023, and 037-140-006) areis located adjacent to, but outside of the RE Overlay Zone. Therefore, the applicant is requesting a General Plan Amendment to include/classify the southern three all-five-project parcels into the RE Overlay Zone, so that the entire site would be located within the RE Overlay Zone. No change in the underlying General Plan land use (Agriculture) is proposed.
- 2. **Zone Change.** The project site is currently zoned General Agricultural with a Geothermal Overlay (A-2-G). The applicant is requesting a Zone Change to include/classify all five project parcels into the Renewable Energy/Geothermal (REG) Overlay Zone (A-2-REG).
- 3. Approval of CUP. Implementation of the project would require the approval of a CUP by the County to allow for the construction and operation of the proposed solar energy facility with an integrated battery storage system. The project site is located on five privately-owned legal parcels zoned General Agricultural with a Geothermal Overlay (A-2-G). With approval of the zone change, the project site would be zoned General Agricultural with a REG Overlay Zone (A-2-REG). Pursuant to Title 9, Division 5, Chapter 8, the following uses are permitted in the A-2 zone subject to approval of a CUP from Imperial County: solar energy electrical generator, battery storage facility, electrical substations, communication towers, and facilities for the transmission of electrical energy.
- 4. Certification of the EIR. After the required public review for the Draft EIR, the County will respond to written comments, edit the document, and produce a Final EIR to be certified by the Planning Commission and Board of Supervisors prior to making a decision on approval or denial of the project.

Subsequent ministerial approvals may include, but are not limited to:

- Grading and clearing permits
- Building permits
- Reclamation plan
- Encroachment permits
- Transportation permit(s)

2.7.2 Discretionary Actions and Approvals by Other Agencies

Responsible Agencies are those agencies that have discretionary approval over one or more actions involved with development of the project. Trustee Agencies are state agencies that have discretionary approval or jurisdiction by law over natural resources affected by a project. These agencies may include, but are not limited to the following:

- California RWQCB Notice of Intent for General Construction Permit
- ICAPCD Fugitive Dust Control Plan, Rule 801 Compliance
- CDFW (Trustee Agency) ESA Compliance, Section 1600 Streambed Alteration Agreement
- USFWS ESA Compliance
- IID Water Supply Agreement

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3 Environmental Analysis, Impacts, and Mitigation

3.1 Introduction to Environmental Analysis

This section provides an overview of the environmental analysis and presents the format for the environmental analysis in each topical section.

3.1.1 Organization of Issue Areas

Chapter 3 provides an analysis of impacts for those environmental topics that the County determined could result in "significant impacts," based on preparation of an Initial Study and review by the County's Environmental Evaluation Committee and responses received during the scoping process, including the NOP review period and public scoping meeting. Sections 3.2 through 3.15 discuss the environmental impacts that may result with approval and implementation of the project, and where impacts are identified, recommends mitigation measures that, when implemented, would reduce significant impacts to a level less than significant. Each environmental issue area in Chapter 3 contains a description of the following:

- The environmental setting as it relates to the specific issue
- The regulatory framework governing that issue
- The threshold of significance (from Appendix G of the CEQA Guidelines)
- The methodology used in identifying and considering the issues
- An evaluation of the project-specific impacts and identification of mitigation measures
- A determination of the level of significance after mitigation measures are implemented
- The identification of any residual significant impacts following mitigation

3.1.2 Format of the Impact Analysis

This analysis presents the potential impacts that could occur under the project along with any supporting mitigation requirements. Each section identifies the resulting level of significance of the impact using the terminology described below following the application of the proposed mitigation. The section includes an explanation of how the mitigation measure(s) reduces the impact in relation to the applied threshold of significance. If the impact remains significant (i.e., at or above the threshold of significance), additional discussion is provided to disclose the implications of the residual impact and indicate why no mitigation is available or why the applied mitigation does not reduce the impact to a less than significant level.

Changes that would result from the project were evaluated relative to existing environmental conditions within the project site as defined in Chapter 2 and illustrated on Figure 2-2 (Chapter 2). Existing environmental conditions are based on the time at which the NOP was published on July 26, 2021. In evaluating the significance of these changes, this EIR applies thresholds of significance that have been developed using: (1) criteria discussed in the CEQA Guidelines; (2) criteria based on factual or

scientific information; and (3) criteria based on regulatory standards of local, state, and/or federal agencies. Mechanisms that could cause impacts are discussed for each issue area.

This EIR uses the following terminology to denote the significance of environmental impacts of the project:

- No impact indicates that the construction, operation, and maintenance of the project would not
 have any direct or indirect effects on the environment. It means no change from existing
 conditions. This impact level does not need mitigation.
- A less than significant impact is one that would not result in a substantial or potentially substantial adverse change in the physical environment. This impact level does not require mitigation, even if feasible, under CEQA.
- A significant impact is defined by CEQA Section 21068 as one that would cause "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project." Levels of significance can vary by project, based on the change in the existing physical condition. Under CEQA, mitigation measures or alternatives to the project must be provided, where feasible, to reduce the magnitude of significant impacts.
- An unmitigable significant impact is one that would result in a substantial or potentially substantial adverse effect on the environment, and that could not be reduced to a less than significant level even with any feasible mitigation. Under CEQA, a project with significant and unmitigable impacts could proceed, but the lead agency would be required to prepare a "statement of overriding considerations" in accordance with State CEQA Guidelines California Code of Regulations (CCR) Section 15093, explaining why the lead agency would proceed with the project in spite of the potential for significant impacts.

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3.2 Aesthetics

This section provides a description of the existing visual and aesthetic resources within the project area and relevant state and local plans and policies regarding the protection of scenic resources. Effects to the existing visual character of the project area as a result of project-related facilities are considered and mitigation is proposed based on the anticipated level of significance. The information provided in this section is summarized from the *Visual Impact Assessment for the Brawley Solar Project* (Appendix B of this EIR) prepared by Chambers Group, Inc.

3.2.1 Existing Conditions

Regional

Imperial County encompasses 4,597 square miles in the southeastern portion of California. The County is bordered by Riverside County on the north, the international border of Mexico on the south, San Diego County on the west and Arizona on the east. The length and breadth of the County provide for a variety of visual resources ranging from desert, sand hills, mountain ranges, and the Salton Sea.

The desert includes several distinct areas that add beauty and contrast to the natural landscape. The barren desert landscape of the Yuha Desert, lower Borrego Valley, East Mesa, and Pilot Knob Mesa provide a dramatic contrast against the backdrop of the surrounding mountain ranges. The West Mesa area is a scenic desert bordered on the east by the Imperial Sand Dunes, the lower Borrego Valley, the East Mesa, and Pilot Knob Mesa.

The eastern foothills of the Peninsular Range are located on the west side of the County. The Chocolate Mountains, named to reflect their dark color, are located in the northeastern portion of the County, extending from the southeast to the northwest between Riverside County and the Colorado River. These mountains reach an elevation of 2,700 feet making them highly visible throughout the County.

Project Site and Vicinity

The project is located on five privately owned parcels designated for agricultural uses. Currently the project site contains alfalfa fields within different levels of harvest. The project site is approximately one mile north from the City of Brawley's jurisdictional limit. Brawley is relatively central within the agricultural portion of the Imperial Valley, which extends from the southeastern portion of the Salton Sea to the United States and Mexico border. The Salton Sea lies northwest of the project site and sits comparatively lower in the landscape than the project site, as does much of the agricultural land to the immediate west and south.

Because of this gradual downward slope from east to west, areas to the north and east of the project site would be more likely to have views of the project where not impeded by natural or built features. Viewers in this area are associated with residences and land uses. North of the project site is agricultural land. Along the eastern edge of the project site there are two residences and agricultural land. South of the project site is a mixture of agricultural land and dirt lots used for staging activities. The City of Brawley Wastewater Treatment Plant is located along the western edge of the project site.

Views in this area are expansive and are generally characterized by sparse development framed by topographical features. Low-profile, weedy plants, such as Quail Brush Scrub and Bush Seepweed, are widespread on undeveloped and unfarmed lands, and ruderal vegetation is along waterways

associated with IID canals. Individual residences, transmission lines, transportation corridors (including roads and railroads), and agricultural equipment are discernable in the foreground (within 0.25 mile) and middle ground (0.25 to 3-5 miles away) views throughout the area. They are identifiable by their vapor plumes. These views to the west from the project site are backdropped by the Coyote Mountains and Fish Creek Mountains while views to the east are backdropped by the Chocolate Mountains.

Visual Character

Aerial imagery was reviewed to identify where the proposed project would potentially be visible from visually sensitive areas and selected preliminary viewpoints for site photography. Field surveys were conducted in March 2021 to photo-document existing visual conditions and views toward the project site. A representative subset of photographed viewpoints was selected. Assessments of existing visual conditions were made based on professional judgment that took into consideration sensitive receptors and sensitive viewing areas in the project area.

Figure 3.2-1 illustrates the photo documented key observation points (KOP) and the direction to which the photographs were taken. The photographs depicting the existing condition at the project site are presented below, and the visual simulations at each KOP depicting the proposed condition are presented in Section 3.2.3. Descriptions of the existing KOPs are as follows:

KOP 1 – View from North Best Avenue. KOP 1 is located along N Best Avenue, at the northeast corner of the project site (Figure 3.2-2). The view from KOP 1 is to the southwest, toward the proposed project's solar arrays (Viewpoint 1). This viewpoint represents views from an identifiable point along the most proximate roadway, where topography allows visibility of the project site. Additionally, the viewpoint represents the residents located at 5210 N Best Avenue in Brawley, California. The view is characterized by flat agricultural land to the west, south, and east with the nearby residence to the northeast. The Coyote Mountains and Fish Creek Mountains are visible far off to the south. The view of the project site is mostly unobstructed except for utility poles traveling along the western side of N Best Avenue.

KOP 2 – View from North Best Avenue and Ward Road. KOP 2 is located at the intersection of N Best Avenue and Ward Road, at the southeast corner of the project site (Figure 3.2-3). The view from KOP 2 is to the northwest, toward the proposed project's solar arrays, BESS, and substation (Viewpoint 2). This viewpoint represents views from an identifiable point along the most proximate roadway, where topography allows visibility of the project site. Additionally, the viewpoint represents the residents located at 5000 N Best Avenue and 5002 N Best Avenue. The view is characterized by flat agricultural land to the north; an abandoned residence and fenced corral to the west; a vacant dirt lot to the south; and the nearby residences to the northeast. Vegetation along the New River is visible to the west and the Chocolate Mountains are visible far off to the north and west. The view of the project site is partially obstructed by vegetation along the old corral and utility poles traveling along the western side of N Best Road.

KOP 3 – View from north end of Del Rio Country Club and Golf Course. KOP 3 is located along the Union Pacific railroad tracks on the northwest end of Del Rio Country Club and Golf Course, approximately 0.25 mile from the project site (Figure 3.2-4). The view from KOP 3 is to the north, toward the proposed project's solar arrays, BESS, substation, and gen-tie line. This viewpoint represents golfers and staff at Del Rio Country Club, where topography allows views of the project site, as well as views from the Union Pacific railway line. The view is characterized by flat, undeveloped land with sparse vegetation to the north and northeast, agricultural land to the east, and the

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landscaped golf course to the west. The railroad tracks travel north through the middle of the view, with the Chocolate Mountain Range visible far off to the north. The view of the project site is unobstructed.

KOP 4 – View from State Route 111 and Andre Road. KOP 4 is located at the corner of SR 111 and Andre Road, along the gen-tie line route (Figure 3.2-5). The view from KOP 4 is to the east, toward the proposed project's gen-tie line, BESS, substation, and solar arrays. This viewpoint represents views from an identifiable point along a well-traveled roadway in the County, where topography allows visibility of the project site. The view is characterized by mainly flat agricultural land to the north and south. The City of Brawley Wastewater Treatment Plant is within the northern portion of the view and a dirt access road leads to an industrial dirt lot with pipelines directly east of the view. The Chocolate Mountain Range is visible far off to the east. The view of the project site is partially obstructed by the City of Brawley Wastewater Treatment Plant, utility poles, and small amounts of vegetation in the foreground.

Figure 3.2-1. Key Observation Points





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Figure 3.2-2. Existing Key Observation Point 1



Figure 3.2-3. Existing Key Observation Point 2



Figure 3.2-4. Existing Key Observation Point 3



Figure 3.2-5. Existing Key Observation Point 4



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Scenic Vista

Scenic vistas are typically expansive views from elevated areas. They may or may not be part of a designated scenic overlook or other area providing a static vista view of a landscape. The project site is located in a rural portion of Imperial County and is not located within an area containing a scenic vista designated by the State or the County's General Plan.

Scenic Highways

According to the Conservation and Open Space Element, no State scenic highways have been designated in Imperial County (County of Imperial 2016). The project site is not located within a state scenic highway corridor, nor are there any state scenic highways located in proximity to the project site. The nearest road segment considered eligible for a State scenic highway designation is the portion of SR 111 from Bombay Beach to the County line. The project site is located approximately 25 miles south of Bombay Beach; therefore, it would not be visible from the location of the proposed projects.

Light, Glare, and Glint

Glare is considered a continuous source of brightness, relative to diffused light, whereas glint is a direct redirection of the sun beam in the surface of a PV solar module. Glint is highly directional, since its origin is purely reflective, whereas glare is the reflection of diffuse irradiance; it is not a direct reflection of the sun.

Because of the nature of the existing agricultural land uses and few residences, limited light is generated from within the project area. The majority of the light and glare in the project area is a result of motor vehicles traveling on surrounding roadways, airplanes, and farm equipment. Local roadways generate glare both during the night hours when cars travel with lights on, and during daytime hours because of the sun's reflection from cars and pavement surfaces. When light is not sufficiently screened and spills over into areas outside of a particular development area the effect is called "light trespassing."

3.2.2 Regulatory Setting

This section identifies and summarizes state and local laws, policies, and regulations that are applicable to the project.

State

California Department of Transportation

Caltrans manages the California Scenic Highway Program. The goal of the program is to preserve and protect scenic highway corridors from changes that would affect the aesthetic value of the land adjacent to the scenic corridor.

Local

Imperial County General Plan

The Imperial County General Plan contains policies for the protection and conservation of scenic resources and open spaces within the County. These policies also provide guidance for the design of

new development. The Conservation and Open Space Element of the General Plan provides specific goals and objectives for maintaining and protecting the aesthetic character of the region. Table 3.2-1 provides an analysis of the proposed project's consistency with the Conservation and Open Space Element Goal 5. Additionally, the Circulation and Scenic Highways Element of the General Plan provides policies for protecting and enhancing scenic resources within highway corridors in Imperial County, consistent with the Caltrans State Scenic Highway Program.

Table 3.2-1. Consistency with Applicable General Plan Conservation and Open Space Policies

General Plan Policies	Consistency with General Plan	Analysis
Goal 5: The aesthetic character of the region shall be protected and enhanced to provide a pleasing environment for residential, commercial, recreational, and tourist activity.	Consistent	The project would result in changes to the visual character of the project area, which is currently characterized as an agricultural landscape. As described in Section 3.2.1, the project site does not contain high levels of visual character or quality; therefore, the project would not result in a significant deterioration in the visual character of the project site or project area.
Objective 5.1: Encourage the conservation and enhancement of the natural beauty of the desert and mountain landscape.	Consistent	The project site is located within an agricultural portion of the County and generally avoids both desert and mountain landscapes.

Source: County of Imperial 2016

County of Imperial Land Use Ordinance, Title 9

The County's Land Use Ordinance Code provides specific direction for lighting requirements.

Division 17: Renewable Energy Resources, Section 91702.00 – Specific Standards for All Renewable Energy Projects

(R) Lights should be directed or shielded to confine direct rays to the project site and muted to the maximum extent consistent with safety and operational necessity.

3.2.3 Impacts and Mitigation Measures

This section presents the significance criteria used for considering project impacts related to aesthetic and visual resources, the methodology employed for the evaluation, an impact evaluation, and mitigation requirements, if necessary.

Thresholds of Significance

Based on CEQA Guidelines Appendix G, project impacts related to aesthetics are considered significant if any of the following occur:

- Have a substantial adverse effect on a scenic vista
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway
- 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

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- publicly accessible vantage points). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area

Methodology

This visual impact analysis is based on field observations conducted in March 2021, as well as a review of maps and aerial photographs for the project area. A representative subset of photographed viewpoints was selected as KOPs, which collectively serve as the basis for this assessment. This selection was done in coordination with ORNI and the County. Assessments of existing visual conditions were made based on professional judgment that took into consideration sensitive receptors and sensitive viewing areas in the project area. The locations of the four KOPs in relation to the project site are presented in Figure 3.2-1 above.

The site photos were used to generate a rendering of the existing conditions and a proposed visualization of the implemented project. The visual simulations, as provided below, provide clear before-and-after images of the location, scale, and visual appearance of the features affected by and associated with the project. Design data — consisting of engineering drawings, elevations, site and topographical contour plans, concept diagrams, and reference pictures — were used as a platform from which digital models were created. In cases where detailed design data were unavailable, more general descriptions about alternative facilities and their locations were used to prepare the digital models.

Impact Analysis

Impact 3.2-1 Would the project have a substantial adverse effect on a scenic vista?

Scenic vistas are typically expansive views from elevated areas that may or may not be part of a designated scenic overlook or other area providing a static view of a landscape. During construction, the use of standard construction equipment including, but not limited to, trucks, cranes, and tractors would be required. The presence of this equipment within the project site during construction would alter views of the area from undeveloped and agricultural land to a construction site. However, the views of construction activity from the surrounding vicinity would be temporary and would not involve any designated scenic vistas as there are no designated scenic vistas in the project vicinity. According to the Imperial County General Plan, the closest scenic resource is the Salton Sea approximately 11 miles northwest of the project site (County of Imperial 2016).

Views from elevated areas near the project site could be considered scenic vistas given the expansiveness of the views and distance one can see under favorable conditions. However, as described further below for the view of the project from all KOPs, the project would not have a substantial adverse effect on such views. Rather, it would be absorbed into the natural and built features that comprise the existing landscape and would not substantially obstruct existing views. Therefore, less than significant impacts to scenic vistas would occur.

Mitigation Measure(s)

No mitigation measures are required.

Impact 3.2-2 Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

There are no designated or eligible state scenic highways in the project vicinity. The nearest road segment among those identified by Imperial County as "having potential as state-designated scenic highways" is the portion of SR 111 from Bombay Beach to the Imperial County/Riverside County boundary. The project site is approximately 25 miles south of Bombay Beach. Therefore, no impacts to scenic resources within any state scenic highways would occur.

Mitigation Measure(s)

No mitigation measures are required.

Impact 3.2-3 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 points). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

The existing visual character in views of the project (Figure 3.2-2 through Figure 3.2-5) would not be substantially altered based primarily on the proximity of viewpoints to the project site. Short-term visual impacts would occur in association with construction activities, including introducing heavy equipment (e.g., cranes), staging and materials storage areas and potential dust and exhaust to the project area. While construction equipment and activity may present a visual nuisance, it would be temporary (approximately 6-9 months) and would not represent a permanent change in views. Therefore, impacts associated with degrading the existing visual character or quality of the project site during construction are considered less than significant. The potential impacts on these KVs are discussed below.

KOP 1 – View from North Best Avenue. Viewpoint 1 shows the view from KOP 1 with the proposed project simulated (Figure 3.2-6). The solar arrays and the security fencing would be the most prominently visible portion of the project from this location. As conceptually shown in the simulation, the project would appear as a comparatively dark, horizontal bar across the majority of the view. The overall effect shown in Viewpoint 1 is the relatively small degree of contrast the project would have with its broader surroundings, which includes views of the Coyote Mountains and Fish Creek Mountains. Solar arrays would not substantially obscure the mountain skyline from this vantage point.

KOP 2 – View from North Best Avenue and Ward Road. Viewpoint 2 shows the view from KOP 2 with the proposed project simulated (Figure 3.2-7). The solar arrays and the security fencing would be the most prominently visible portion of the project from this location. With demolition of the abandoned residence and corral, the project's BESS and substation would also be visible from KOP 2 to the west. As conceptually shown in the simulation, the project would appear as a generally uniform dark line across the view. The overall effect shown in Viewpoint 2 is the relatively small degree of contrast the project would have with its broader surroundings, which include views of the Chocolate Mountains. The BESS, substation, and solar arrays would not substantially obscure the mountain skyline from this vantage point.

KOP 3 – View from north end of Del Rio Country Club and Golf Course. KOP 3 shows the view from KOP 3 with the proposed project simulated (Figure 3.2-8). The gen-tie structures would be the most

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prominently visible portion of the project from this location. As conceptually shown in the simulation, the gen-tie structures would be visible in the center of the view, traveling from east to west approximately 1.75 miles. While appearing as new and highly visible features, the transmission structures would relate to the numerous lines visible throughout the landscape. They would also occupy a relatively narrow portion of the view to the north from KOP 3.

The substation for the proposed project has not yet been designed. However, the facility shown in KOP 3 is an approximation based on representative examples of substations of similar size and in similar environments. As simulated, the substation would be partially visible in views from KOP 3, alongside the solar arrays, which would appear as a comparatively dark, horizontal bar across a portion of the view's middle ground. Aside from the relatively narrow gen-tie structures, no project component would substantially obscure or appear above the mountain skyline from this vantage point.

KOP 4 – View from State Route 111 and Andre Road. Viewpoint 4 shows the view from KOP 4 with the proposed project simulated (Figure 3.2-9). The gen-tie structures would be the most prominently visible portion of the project from this location. As conceptually shown in the simulation, the gen-tie structures would be visible in the southern portion of the view, traveling from east to west approximately 0.5 mile. While appearing as new and highly visible features, the transmission structures would relate to the numerous lines visible throughout the landscape. They would also occupy a relatively narrow portion of the view to the south from KOP 4.

As simulated, views of the substation and BESS would be visible in the distance from KOP 4. These structures would relate to the nearby industrial features in the landscape, including the nearby pipelines. The solar arrays would appear as a comparatively dark, horizontal bar across the remainder of the view. No project component would substantially obscure or appear above the mountain skyline from this vantage point.

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Figure 3.2-6. Proposed Key Observation Point 1



Figure 3.2-7. Proposed Key Observation Point 2



Figure 3.2-8. Proposed Key Observation Point 3



Figure 3.2-9. Proposed Key Observation Point 4



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Conclusion

The views from KOPs 1 and 2 show the project's solar arrays and the security fencing most prominently, which would appear as a comparatively dark, horizontal bar across the view. The overall effect of the project from these KOPs is relatively small degree of contrast the project would have with its broader surroundings and a small interruption of views of the surrounding mountains.

In the view from KOPs 3 and 4, new transmission structures that would be part of the project's interconnection would appear large in scale; however, the structures would be comparable in size and appearance to other structures visible throughout the surrounding landscape, including multiple existing transmission lines. As previously described, the project would not substantially degrade the existing visual character or quality of views from this distance; rather it would appear absorbed into the broader landscape that already includes agricultural development, electricity transmission, geothermal power plants, and the City of Brawley Wastewater Treatment Plant. These effects would be less than significant.

Mitigation Measure(s)

No mitigation measures are required.

Impact 3.2-4 Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

The project would not include any source of nighttime lighting and therefore would not be a source of substantial light in the area outside of the project site. If constructed, lighting would be provided on the microwave tower. A glare hazard analysis was also prepared for the project (Appendix B of this EIR). It concluded that sensitive viewers near the project, including residences, a nearby golf course, major roadways, and approach slopes associated with the Brawley Municipal Airport, would not experience glare effects from the project. These effects would be less than significant.

Mitigation Measure(s)

No mitigation measures are required.

3.2.4 Decommissioning/Restoration and Residual Impacts

Decommissioning/Restoration

If at the end of the PPA term, no contract extension is available for a power purchaser, no other buyer of the energy emerges, or there is no further funding of the proposed project, the proposed project will be decommissioned and dismantled. No grading or significant landform modifications would be required during decommissioning activities upon site restoration in the future. Although the project site would be visually disrupted in the short-term during decommissioning activities, because extensive grading is not required and these activities would be temporary, the visual character of the project site would not be substantially degraded in the short-term and related impacts would be less than significant.

Residual

Impacts related to glare and glint impacts to roadway travelers, nearby residences, or flights would be less than significant and no additional mitigation measures are required. Changes to visual character of the project area would be less than significant and would be transitioned back to their prior (pre-solar project) conditions following site decommissioning. Based on these conclusions, implementation of the proposed project would not result in residual significant unmitigable impacts to the visual character of the project site or add substantial amounts of light and glare.

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3.3 Agricultural Resources

This section provides an overview of existing agricultural resources within the project site and identifies applicable federal, state, and local policies related to the conservation of agricultural lands. This includes a summary of the production outputs, soil resources, and adjacent operations potentially affected by the project. The impact assessment in Section 3.3.3 provides an evaluation of potential adverse effects on agricultural resources based on criteria derived from the CEQA Guidelines in conjunction with actions proposed in Chapter 2, Project Description. Section 3.3.4 provides a discussion of residual impacts, if any.

No forestry resources are present within the project site and, therefore, this section focuses on issues related to agricultural resources.

3.3.1 Existing Conditions

Agriculture has been the single most important economic activity of Imperial County throughout the 1900s, and is expected to play a major economic role in the foreseeable future. The gross annual value of agricultural production in the County has hovered around \$1 billion for the last several years, making it the County's largest source of income and employment.

Imperial County agriculture is a major producer and supplier of high quality plant and animal foods and non-food products. In 2019, agriculture contributed a total of \$2.01 billion to the county economy. Vegetable and melon crops were the single largest production category by dollar value (\$799 million). Livestock represented the second largest category (\$522 million) and consisted mostly of feedlot cattle (\$449 million). Field crops ranked third with \$498 million (Imperial County Agricultural Commissioner 2019).

Important Farmland

According to the California Department of Conservation's (DOC) California Important Farmland Finder and as shown on Figure 3.3-1, the majority of the project site is designated as Farmland of Statewide Importance (205 acres), with a pocket of Prime Farmland (4.4 acres) and Farmland of Local Importance (12 acres) located in the southern portion of the project site (DOC 2021). Approximately 1 acre of Unique Farmland occurs along the western boundary of the project site.

Williamson Act Contract Land

According to the 2016/2017 Imperial County Williamson Act Map produced by the DOC, the project site is not located on Williamson Act contracted land (DOC 2016).

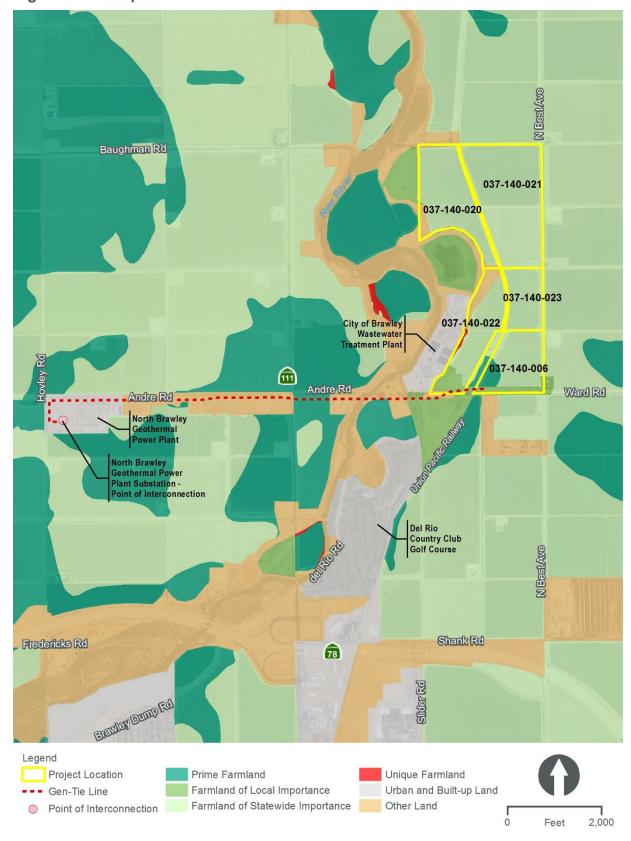


Figure 3.3-1. Important Farmlands

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3.3.2 Regulatory Setting

This section identifies and summarizes state and local laws, policies, and regulations that are applicable to the project.

State

California Land Conservation Act

The Williamson Act (California Land Conservation Act, California Government Code, Section 51200 et seq.) is a statewide mechanism for the preservation of agricultural land and open space land. The Act provides a comprehensive method for local governments to protect farmland and open space by allowing land in agricultural use to be placed under contract (agricultural preserve) between a local government and a landowner.

Under the provisions of the Williamson Act (California Land Conservation Act 1965, Section 51200), landowners contract with the County to maintain agricultural or open space use of their lands in return for reduced property tax assessment. The contract is self-renewing and the landowner may notify the County at any time of intent to withdraw the land from its preserve status. Withdrawal involves a 10-year period of tax adjustment to full market value before protected open space can be converted to urban uses. Consequently, land under a Williamson Act Contract can be in either a renewal status or a nonrenewable status. Lands with a nonrenewable status indicate the farmer has withdrawn from the Williamson Act Contract and is waiting for a period of tax adjustment for the land to reach its full market value. Nonrenewable and cancellation lands are candidates for potential urbanization within a period of 10 years.

The requirements necessary for cancellation of land conservation contracts are outlined in Government Code Section 51282. The County must document the justification for the cancellation through a set of findings. Unless the land is covered by a farmland security zone contract, the Williamson Act requires that local agencies make both the Consistency with the Williamson Act and Public Interest findings.

On February 23, 2010, the Imperial County Board of Supervisors voted to not accept any new Williamson Act contracts and not to renew existing contracts because of the elimination of the subvention funding from the state budget. The County reaffirmed this decision in a vote on October 12, 2010, and notices of nonrenewal were sent to landowners with Williamson Act contracts following that vote. The applicable deadlines for challenging the County's actions have expired, and, therefore, all Williamson Act contracts in Imperial County terminated on or before December 31, 2018.

California Farmland Mapping and Monitoring Program

The California DOC, under the Division of Land Resource Protection, has set up the Farmland Mapping and Monitoring Program (FMMP), which monitors the conversion of the state's farmland to and from agricultural use. The map series identifies eight classifications, as defined below, and uses a minimum mapping unit size of 10 acres.

 Prime Farmland has the best combination of physical and chemical features able to sustain long-term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the 4 years prior to the mapping date.

- Farmland of Statewide Importance is similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the 4 years prior to the mapping date.
- Unique Farmland consists of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include nonirrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the 4 years prior to the mapping date.
- Farmland of Local Importance is land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee.
- Grazing Land is land on which the existing vegetation is suited to the grazing of livestock. This
 category was developed in cooperation with the California Cattlemen's Association, University
 of California Cooperative Extension, and other groups interested in the extent of grazing
 activities.
- Urban and Built-up Land is occupied by structures with a building density of at least one unit
 to 1.5 acre, or approximately six structures to a 10-acre parcel. Common examples include
 residential, industrial, commercial, institutional facilities, prisons, cemeteries, airports, golf
 courses, sanitary landfills, sewage treatment, and water control structures.
- Water is defined as perennial water bodies with an extent of at least 40 acres.
- Other Land is land not included in any other mapping category. Common examples include low density rural developments, vegetative and riparian areas not suitable for livestock grazing, confined animal agriculture facilities, strip mines, borrow pits, and water bodies smaller than 40 acres. Vacant and nonagricultural land surrounded on all sides by urban development and greater than 40 acres is mapped as Other Land. More detailed data on these uses is available in counties containing the Rural Land Use Mapping categories.

The program also produces a biannual report on the amount of land converted from agricultural to non-agricultural use. The program maintains an inventory of state agricultural land and updates its "Important Farmland Series Maps" every 2 years. Table 3.3-1 provides a summary of agricultural land within Imperial County converted to non-agricultural uses during the time frame from 2016 to 2018.

Table 3.3-1. Imperial County Change in Agricultural Land Use Summary (2016 to 2018)

	Total Acreage Inventoried		2016 to 2018 Acreage Changes			
Land Use Category	2016	2018	Acres Lost (-)	Gained (+)	Total Acreage Changed	Net Acreage Changed
Prime Farmland	190,206	189,163	1,699	656	2,355	-1,043
Farmland of Statewide Importance	297,272	291,596	6,330	654	6,984	-5,676
Unique Farmland	2,071	1,905	190	24	214	-166
Farmland of Local Importance	38,923	39,711	1,587	2,375	3,962	788
Important Farmland Subtotal	528,472	522,375	9,806	3,709	13,515	-6,097
Grazing Land	0	0	0	0	0	0
Agricultural Land Subtotal	528,472	522,375	9,806	3,709	13,515	-6,097

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Table 3.3-1. Imperial County Change in Agricultural Land Use Summary (2016 to 2018)

	Total Acreage Inventoried		2016 to 2018 Acreage Changes			
Land Use Category	2016	2018	Acres Lost (-)	Gained (+)	Total Acreage Changed	Net Acreage Changed
Urban and Built-Up Land	37,412	41,764	301	4,653	4,954	4,352
Other Land	461,891	463,488	712	2,309	3,021	1,597
Water Area	749	897	125	273	398	148
Total Area Inventoried	1,028,524	1,028,524	10,944	10,944	21,888	0

Source: DOC 2018

Local

County of Imperial General Plan

The Agricultural Element of the County's General Plan serves as the primary policy statement for implementing development policies for agricultural land use in Imperial County. The goals, objectives, implementation programs, and policies found in the Agricultural Element provide direction for new development as well as government actions and programs. Imperial County's Goals and Objectives are intended to serve as long-term principles and policy statements to guide agricultural use decision-making and uphold the community's ideals.

Agriculture has been the single most important economic activity in the County throughout its history. The County recognizes the area as one of the finest agricultural areas in the world because of several environmental and cultural factors including good soils, a year-round growing season, the availability of adequate water transported from the Colorado River, extensive areas committed to agricultural production, a gently sloping topography, and a climate that is well-suited for growing crops and raising livestock. The Agricultural Element in the County General Plan demonstrates the long-term commitment by the County to the full promotion, management, use, and development and protection of agricultural production, while allowing logical, organized growth of urban areas (County of Imperial 2015).

The County's Agricultural Element identifies several Implementation Programs and Policies for the preservation of agricultural resources. The Agricultural Element recognizes that the County can and should take additional steps to provide further protection for agricultural operations and at the same time provide for logical, organized growth of urban areas. The County must be specific and consistent about which lands will be maintained for the production of food and fiber and for support of the County's economic base. The County's strategy and overall framework for maintaining agriculture includes the following policy directed at the preservation of Important Farmland:

The overall economy of the County is expected to be dependent upon the agricultural industry for the foreseeable future. As such, all agricultural land in the County is considered as Important Farmland, as defined by federal and state agencies, and should be reserved for agricultural uses. Agricultural land may be converted to non-agricultural uses only where a clear and immediate need can be demonstrated, such as requirements for urban housing, commercial facilities, or employment opportunities. All existing agricultural land will be preserved for irrigation agriculture, livestock production, aquaculture, and other agriculture-related uses

except for non-agricultural uses identified in this General Plan or in previously adopted City General Plans.

The following program is provided in the Agricultural Element:

No agricultural land designated except as provided in Exhibit C [of the Agricultural Element] shall be removed from the Agriculture category except where needed for use by a public agency, for geothermal purposes, where a mapping error may have occurred, or where a clear long-term economic benefit to the County can be demonstrated through the planning and environmental review process. The Board (or Planning Commission) shall be required to prepare and make specific findings and circulate same for 60 days (30 days for parcels considered under Exhibit C of this [Agricultural] element) before granting final approval of any proposal, which removes land from the Agriculture category.

Also, the following policy addresses Development Patterns and Locations on Agricultural Land:

"Leapfrogging" or "checkerboard" patterns of development have intensified recently and result in significant impacts on the efficient and economic production of adjacent agricultural land. It is a policy of the County that leapfrogging will not be allowed in the future. All new non-agricultural development will be confined to areas identified in this plan for such purposes or in Cities' adopted Spheres of Influence, where new development must adjoin existing urban uses. Non-agricultural residential, commercial, or industrial uses will only be permitted if they adjoin at least one side of an existing urban use, and only if they do not significantly impact the ability to economically and conveniently farm adjacent agricultural land.

Agricultural Element Programs that address "leapfrogging" or "checkerboard" development include:

All non-agricultural uses in any land use category shall be analyzed during the subdivision, zoning, and environmental impact review process for their potential impact on the movement of agricultural equipment and products on roads located in the Agriculture category, and for other existing agricultural conditions which might impact the projects, such as noise, dust, or odors.

The Planning and Development Services Department shall review all proposed development projects to assure that any new residential or non-agricultural commercial uses located on agriculturally zoned land, except land designated as a Specific Plan Area, be adjoined on at least one entire property line to an area of existing urban uses. Developments that do not meet these criteria should not be approved.

Table 3.3-2 provides a General Plan goal and policy consistency evaluation for the project.

Table 3.3-2. Project Consistency with Applicable General Plan Agricultural Policies

	Consistency with General	
General Plan Policies	Plan	Analysis
Goal 1. All Important Farmland, including the categories of Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance, as defined by federal and state agencies, should be reserved for agricultural uses.	Consistent	The project would temporarily convert land designated as Prime Farmland, Farmland of Statewide Importance, and Unique Farmland to non-agricultural uses, however, as part of the project, a reclamation plan when the project is decommissioned at the end of its life spans will be utilized. The reclamation plan includes the removal, recycling, and/or disposal of all solar arrays, inverters, battery energy storage system, transformers and other structures on the site, as well as restoration of the site to its pre-project

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Table 3.3-2. Project Consistency with Applicable General Plan Agricultural Policies

Table 3.3-2. Project Consistency with Applicable General Plan Agricultural Policies Consistency			
	with General		
General Plan Policies	Plan	Analysis	
		condition. Therefore, the proposed project would not permanently convert Prime Farmland, Farmland of Statewide Importance, or Unique Farmland to non-agricultural uses.	
Goal 2. Adopt policies that prohibit "leapfrogging" or "checkerboard" patterns of nonagricultural development in agricultural areas and confine future urbanization to adopted Sphere of Influence area.	Consistent	The project site is designated for agriculture land use in the County General Plan. The project would include development of a solar facility and associated infrastructure adjacent to productive agricultural lands to the north and east of the project site; however, the project is located adjacent to the City of Brawley Wastewater Treatment Plant along the western edge of the project site. The Union Pacific Railway transects the project site. Additionally, this development would not include a residential component that would induce urbanization adjacent to the projects. Furthermore, as shown on Figure LUE-1: Land Use Map of the City of Brawley Final General Plan 2030, the project site is located within the City of Brawley's adopted Sphere of Influence 1. As a new non-agricultural development, the proposed project would be consistent with this policy as it would be confined to areas in a city's adopted sphere of influence and adjoins an existing urban use (water treatment plant). Furthermore, with the approval of a General Plan Amendment, Zone Change, and CUP, the project would be consistent with the County's Land Use Ordinance. Consistency with the Land	
		Use Ordinance implies consistency with the General Plan land use designation.	
Objective 2.1. Do not allow the placement of new non-agricultural land uses such that agricultural fields or parcels become isolated or more difficult to economically and conveniently farm.	Consistent	The project would include development of a solar facility adjacent to productive agricultural lands to the north and east of the project site; however, the project is located adjacent to the City of Brawley Wastewater Treatment Plant along the western edge of the project site. The Union Pacific Railway transects the project site. Neither construction nor operation of the solar facility would not make it difficult to economically or conveniently farm.	
Objective 2.2. Encourage the infilling of development in urban areas as an alternative to expanding urban boundaries.	Consistent	The project involves the construction and operation of solar facility in a rural area. While the proposed project will introduce development in the area, it does not include residential uses that would, in turn, create a demand for other uses such as commercial, employment centers, and supporting services.	
Objective 2.3. Maintain agricultural lands in parcel size configurations that help	Consistent	The project would temporarily convert agricultural land to non-agricultural uses.	

¹ City of Brawley. 2008. Figure LUE-1: Land Use Map of the City of Brawley Final General Plan 2030. Available on-line at: https://www.brawley-ca.gov/cms/kcfinder/upload/files/planning/Final GP Master-PDF.pdf

Table 3.3-2. Project Consistency with Applicable General Plan Agricultural Policies

Table 3.3-2. Project Consistency with Applicable General Plan Agricultural Policies			
General Plan Policies	Consistency with General Plan	Analysis	
assure that viable farming units are retained.	Plati	However, the project would not be subdivided into smaller parcels. A reclamation plan will be prepared for the project site, which when implemented, would return the site to pre-project conditions after the solar uses are discontinued.	
Objective 2.4. Discourage the parcelization of large holdings.	Consistent	See response to Objective 2.3 above.	
Objective 2.6. Discourage the development of new residential or other non-agricultural areas outside of city "sphere of influence" unless designated for non-agricultural use in the County General Plan, or for necessary public facilities.	Consistent	Upon approval of a CUP and zone change into the RE Overlay Zone designation, the proposed project would be an allowable use within an applicable agricultural zone, and the existing zoning of the project site would be consistent with the existing General Plan land use designation.	
Goal 3. Limit the introduction of conflicting uses into farming areas, including residential development of existing parcels which may create the potential for conflict with continued agricultural use of adjacent property.	Consistent	Upon approval of a CUP and zone change into the RE Overlay Zone designation, the proposed project would be an allowable use within an applicable agricultural zone. Additionally, the project does not include the development of housing.	
Objective 3.2. Enforce the provisions of the Imperial County Right-to-Farm Ordinance (No. 1031).	Consistent	The Imperial County Right-to-Farm Ordinance would be enforced. With mitigation measures proposed in other resource sections (e.g., air quality, noise, etc.), project-related activities would not adversely affect adjacent agricultural operations. The proposed project will be required to comply with ICAPCD's rules and regulations to control emissions or hazardous air pollutants, including, but not limited to, Regulation VIII and Rule 407. Regulation VIII sets forth rules regarding the control of fugitive dust, including fugitive dust from construction activities. Regulation VIII requires implementation of fugitive dust control measures to reduce emissions from earthmoving, unpaved roads, handling of bulk materials, and control of track-out/carry-out dust from active construction sites. Rule 407 prohibits a person from discharging from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.	
Objective 3.3. Enforce the provisions of the State nuisance law (California Code Sub-Section 3482).	Consistent	The provisions of the State nuisance law would be incorporated into the project. As discussed below, there is the potential that weeds or other pests may occur within the solar fields if these areas are not properly maintained and managed to control weeds and pests. Mitigation Measure AG-2 requires the project applicant to develop a Pest Management Plan prior to the issuance of a	

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Table 3.3-2. Project Consistency with Applicable General Plan Agricultural Policies

General Plan Policies	Consistency with General Plan	Analysis
		grading permit or building permit (whichever occurs first).

Source: County of Imperial General Plan 2015

Notes:

CUP = conditional use permit; RE = renewable energy

County of Imperial "Right to Farm" Ordinance

On August 7, 1990, the County Board of Supervisors approved the "Right-to-Farm" Ordinance, which permits operation of properly conducted agricultural operations within Imperial County after recognizing the potential threats to agricultural productivity posed by increased nonagricultural land uses throughout the County. The ordinance is intended to reduce the loss to the County of its agricultural resources and promote a good neighbor policy by advising purchasers and users of adjacent properties about the potential problems and inconveniences associated with agricultural operations. The ordinance also establishes a "County Agricultural Grievance Committee" to settle disputes between agriculturalists and adjacent property owners.

3.3.3 Impacts and Mitigation Measures

This section presents the significance criteria used for considering project impacts related to agricultural resources, the methodology employed for the evaluation, an impact evaluation, and mitigation requirements, if necessary.

Thresholds of Significance

Based on CEQA Guidelines Appendix G, project impacts related to agricultural resources are considered significant if any of the following occur:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland)
 as shown on the maps prepared pursuant to the FMMP of the California Resources Agency,
 to non-agricultural use
- Conflict with existing zoning for agricultural use, or a Williamson Act contract
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use

Methodology

This analysis evaluates the potential for the project, as described in Chapter 2, Project Description, to adversely impact agricultural resources within the project site based on the applied significance criteria as identified above. The analysis prepared for this EIR relied on Important Farmland and Williamson Act maps for Imperial County produced by the California DOC's Division of Land Resource Protection. These sources were used to determine the agricultural significance of the land in the project site. Per the County of Imperial General Plan, Farmland of Local Importance is also considered an important farmland.

Additionally, potential conflicts with existing agricultural zoning or other changes resulting from the implementation of the project, which could indirectly remove Important Farmland from agricultural production or reduce agricultural productivity were considered. Sources used in this evaluation included, but were not limited to, the Imperial County General Plan and zoning ordinance. The conceptual site plan for the project (Chapter 2, Figure 2-3) was also used to evaluate potential impacts.

Impact Analysis

Impact 3.3-1 Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) as shown on the maps prepared pursuant to the FMMP of the California Resources Agency, to non-agricultural use?

Implementation of the project would result in the temporary conversion of approximately 227 acres of land currently under or available for agricultural production to non-agricultural uses. Approximately 4.4 acres of the project site is classified as Prime Farmland, 205 acres as Farmland of Statewide Importance, and 1 acre as Unique Farmland. The loss of agricultural land designed Prime Farmland, Farmland of Statewide Importance, and Unique Farmland is typically considered a significant impact under CEQA. Therefore, their conversion to non-agricultural use, albeit temporary, is considered a significant impact. Implementation of Mitigation Measures AG-1a and AG-1b would reduce this impact to a level less than significant.

Mitigation Measure(s)

AG-1a Payment of Agricultural and Other Benefit Fees. One of the following options included below is to be implemented prior to the issuance of a grading permit or building permit for the project:

Mitigation for Non-Prime Farmland

Option 1: Provide Agricultural Conservation Easement(s). The Permittee shall procure Agricultural Conservation Easements on a "1 on 1" basis on land of equal size, of equal quality farmland, outside the path of development. The conservation easement shall meet DOC regulations and shall be recorded prior to issuance of any grading or building permits; or

Option 2: Pay Agricultural In-Lieu Mitigation Fee. The Permittee shall pay an "Agricultural In-Lieu Mitigation Fee" in the amount of 20 percent of the fair market value per acre for the total acres of the proposed site based on five comparable sales of land used for agricultural purposes as of the effective date of the permit, including program costs on a cost recovery/time and material basis. The Agricultural In-Lieu Mitigation Fee, will be placed in a trust account administered by the Imperial County Agricultural Commissioner's office and will be used for such purposes as the acquisition, stewardship, preservation and enhancement of agricultural lands within Imperial County; or,

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Option 3: Public Benefit Agreement. The Permittee and County voluntarily enter into an enforceable Public Benefit Agreement or Development Agreement that includes an Agricultural Benefit Fee payment that is 1) consistent with Board Resolution 2012-005; 2) the Agricultural Benefit Fee must be held by the County in a restricted account to be used by the County only for such purposes as the stewardship, preservation and enhancement of agricultural lands within Imperial County and to implement the goals and objectives of the Agricultural Benefit program, as specified in the Development Agreement, including addressing the mitigation of agricultural job loss on the local economy.

Mitigation for Prime Farmland

Option 1: Provide Agricultural Conservation Easement(s). The Permittee shall procure Agricultural Conservation Easements on a "2 on 1" basis on land of equal size, of equal quality farmland, outside the path of development. The conservation easement shall meet DOC regulations and shall be recorded prior to issuance of any grading or building permits; or

Option 2: Pay Agricultural In-Lieu Mitigation Fee. The Permittee shall pay an "Agricultural In-Lieu Mitigation Fee" in the amount of 30 percent of the fair market value per acre for the total acres of the proposed site based on five comparable sales of land used for agricultural purposes as of the effective date of the permit, including program costs on a cost recovery/time and material basis. The Agricultural In-Lieu Mitigation Fee, will be placed in a trust account administered by the Imperial County Agricultural Commissioner's office and will be used for such purposes as the acquisition, stewardship, preservation and enhancement of agricultural lands within Imperial County; or,

Option 3: Public Benefit Agreement. The Permittee and County voluntarily enter into an enforceable Public Benefit Agreement or Development Agreement that includes an Agricultural Benefit Fee payment that is 1) consistent with Board Resolution 2012-005; 2) the Agricultural Benefit Fee must be held by the County in a restricted account to be used by the County only for such purposes as the stewardship, preservation and enhancement of agricultural lands within Imperial County and to implement the goals and objectives of the Agricultural Benefit program, as specified in the Development Agreement, including addressing the mitigation of agricultural job loss on the local economy; the Project and other recipients of the Project's Agricultural Benefit Fee funds; or emphasis on creation of jobs in the agricultural sector of the local economy for the purpose of off-setting jobs displaced by this Project.

Option 4: Avoid Prime Farmland. The Permittee must revise their CUP Application/Site Plan to avoid Prime Farmland.

AG-1b Site Reclamation Plan. The DOC has clarified the goal of a reclamation and decommissioning plan: the land must be restored to land which can be farmed. In addition to Mitigation Measure AG-1a for Prime Farmland and Non-Prime Farmland, the Applicant shall submit to Imperial County, a Reclamation Plan prior to issuance of a grading permit. The Reclamation Plan shall document the procedures by which the project site will be returned to its current agricultural condition. Permittee shall also provide financial assurance/bonding in the amount equal to a cost estimate prepared by a California-licensed general contractor or civil engineer for implementation of the Reclamation Plan in the even Permittee fails to perform the Reclamation Plan.

Significance after Mitigation

With the implementation of Mitigation Measure AG-1a, the project applicant would be required to minimize the impact associated with the permanent loss of valuable farmlands through either provision of an agricultural conservation easement, payment into the County agricultural fee program, or entering into a public benefit agreement. Mitigation Measure AG-1b will ensure that the project applicant adheres to the terms of the agricultural reclamation plan prepared for the project site, which would address the temporary conversion impact. This mitigation measure would reduce this impact to a less than significant level.

Impact 3.3-2 Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

Williamson Act. The project site is not located on Williamson Act contracted land (DOC 2016). Therefore, the project would not conflict with a Williamson Act contract and no impact would occur.

Agricultural Zoning. Pursuant to the County General Plan, the project site is located on land designated for agricultural uses. The project would be constructed on land currently zoned A-2-G (General Agricultural with a Geothermal Overlay). Pursuant to Title 9, Division 5, Chapter 8, the following uses are permitted in the A-2 zone subject to approval of a CUP from Imperial County: solar energy electrical generator, battery storage facility, electrical substations, communication towers, and facilities for the transmission of electrical energy.

Upon approval of a CUP and zone change into the RE Overlay Zone designation, the project's uses would be consistent with the Imperial County Land Use Ordinance and thus is also consistent with the General Plan land use designation of the site. Additionally, the operation of the solar energy facility is not expected to inhibit or adversely affect adjacent agricultural operations through the placement of sensitive land uses or generation of excessive dust or shading. Based on these considerations, the impact is considered less than significant.

Mitigation Measure(s)

No mitigation measures are required.

Impact 3.3-3 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?

The Agricultural Element of the County's General Plan serves as the primary policy statement for implementing development policies for agricultural land use in Imperial County. The goals, objectives, implementation programs, and policies found in the Agricultural Element provide direction for private

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development as well as government actions and programs. A summary of the relevant Agricultural goals and objectives and the project's consistency with applicable goals and objectives is summarized in Table 3.3-2. As provided, the project is generally consistent with certain Agricultural Element Goals and Objectives of the County General Plan, but mitigation is required for the project.

Per County policy, agricultural land may be converted to non-agricultural uses only where a clear and immediate need can be demonstrated, such as requirements for urban housing, commercial facilities, or employment opportunities. Further, no agricultural land designated exempt shall be removed from the agriculture category except where needed for use by a public agency, for geothermal purposes, where a mapping error may have occurred, or where a clear long-term economic benefit to the County can be demonstrated through the planning and environmental review process.

As discussed under Impact 3.3-1, although the project would convert lands currently under agricultural production, the project applicant is proposing agriculture as the end use and will prepare a site-specific Reclamation Plan to minimize impacts related to short- and long-term conversion of farmland to non-agricultural use. The reclamation plan includes the removal, recycling, and/or disposal of all solar arrays, inverters, transformers and other structures on the site, as well as restoration of the site to its pre-project condition. The County is responsible for approving the reclamation plan for each project and confirming that financial assurances for the project is in conformance with Imperial County ordinances prior to the issuance of any building permits. This shall be made a condition of approval and included in the CUP. Additionally, the County is requiring Mitigation Measure AG-1b to ensure that post-restoration of the project facilitates result in no net reduction in Prime Farmland or Farmland of Statewide Importance.

The project would not directly impact the movement of agricultural equipment on roads located within the agriculture category and access to existing agriculture-serving roads would not be precluded or hindered by the project. Project construction would include the renovation of existing dirt roads to allweather surfaces (to meet the County standards) from N Best Avenue to the City of Brawley wastewater treatment plant. However, the proposed renovation would not otherwise affect other agricultural operations in the area. With mitigation measures proposed in other resource sections (e.g. air quality, noise, etc.), project-related activities would not adversely affect adjacent agricultural operations. The proposed project will be required to comply with ICAPCD's rules and regulations to control emissions or hazardous air pollutants, including, but not limited to, Regulation VIII and Rule 407. Regulation VIII sets forth rules regarding the control of fugitive dust, including fugitive dust from construction activities. Regulation VIII requires implementation of fugitive dust control measures to reduce emissions from earthmoving, unpaved roads, handling of bulk materials, and control of track-out/carry-out dust from active construction sites. Rule 407 prohibits a person from discharging from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property. Further, the provisions of the Imperial County Right-to-Farm Ordinance (No. 1031) and the State nuisance law (California Code Sub-Section 3482) would continue to be enforced.

With the implementation of the project, it is possible that the physical and chemical makeup of the soil materials within the upper soil horizon may change. For example, improper soil stockpiling and management of the stockpiles could result in increased decomposition of soil organic materials, increased leaching of plant available nitrogen, and depletion of soil biota communities (e.g., Rhizobium or Frankia). Any reductions in agricultural productivity could significantly limit the types of crops (e.g., deeper rooting crops, orchards, etc.) that may be grown within the project site in the future. However,

implementation of Mitigation Measure AG-1b would require the project applicant or its successor in interest for implementing a reclamation plan when the project is decommissioned at the end of its lifespan. The reclamation plan includes restoration of the site to its pre-project condition. Implementation of Mitigation Measure AG-1b would reduce this impact to a level less than significant.

Additionally, there is the potential that weeds or other pests may occur within the solar field if the area is not properly maintained and managed to control weeds and pests. This is considered a significant impact. Implementation of Mitigation Measure AG-2 would reduce this impact to a level less than significant.

Mitigation Measure(s)

- AG-2 Pest Management Plan. Prior to the issuance of a grading permit or building permit (whichever occurs first), a Pest Management Plan shall be developed by the project applicant and approved by the County of Imperial Agricultural Commissioner. The project applicant shall maintain a Pest Management Plan until reclamation is complete. The plan shall provide the following:
 - 1. Monitoring, preventative, and management strategies for weed and pest control during construction activities at any portion of the project (e.g., transmission line);
 - 2. Control and management of weeds and pests in areas temporarily disturbed during construction where native seed will aid in site revegetation as follows:
 - Monitor for all pests including insects, vertebrates, weeds, and pathogens.
 Promptly control or eradicate pests when found, or when notified by the
 Agricultural Commissioner's office that a pest problem is present on the project
 site. The assistance of a licensed pest control advisor is recommended. All
 treatments must be performed by a qualified applicator or a licensed pest
 control business;
 - All treatments must be performed by a qualified applicator or a licensed pest control operator;
 - "Control" means to reduce the population of common pests below economically damaging levels, and includes attempts to exclude pests before infestation, and effective control methods after infestation. Effective control methods may include physical/mechanical removal, bio control, cultural control, or chemical treatments;
 - Use of "permanent" soil sterilants to control weeds or other pests is prohibited because this would interfere with reclamation;
 - Notify the Agricultural Commissioner's office immediately regarding any suspected exotic/invasive pest species as defined by the California Department of Food Agriculture and the U.S. Department of Agriculture. Request a sample be taken by the Agricultural Commissioner's Office of a suspected invasive species. Eradication of exotic pests shall be done under the direction of the Agricultural Commissioner's Office and/or California Department of Food and Agriculture;
 - Obey all pesticide use laws, regulations, and permit conditions;

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- Allow access by Agricultural Commissioner staff for routine visual and trap pest surveys, compliance inspections, eradication of exotic pests, and other official duties:
- Ensure all project employees that handle pest control issues are appropriately trained and certified, all required records are maintained and made available for inspection, and all required permits and other required legal documents are current:
- Maintain records of pests found and treatments or pest management methods used. Records should include the date, location/block, project name (current and previous if changed), and methods used. For pesticides include the chemical(s) used, EPA Registration numbers, application rates, etc. A pesticide use report may be used for this;
- Submit a report of monitoring, pest finds, and treatments, or other pest
 management methods to the Agricultural Commissioner quarterly within
 15 days after the end of the previous quarter, and upon request. The report is
 required even if no pests were found or treatment occurred. It may consist of
 a copy of all records for the previous quarter, or may be a summary letter/report
 as long as the original detailed records are available upon request.
- A long-term strategy for weed and pest control and management during the operation of the proposed projects. Such strategies may include, but are not limited to:
 - Use of specific types of herbicides and pesticides on a scheduled basis.
- Maintenance and management of project site conditions to reduce the potential for a significant increase in pest-related nuisance conditions on surrounding agricultural lands.
- 5. The project shall reimburse the Agricultural Commissioner's office for the actual cost of investigations, inspections, or other required non-routine responses to the site that are not funded by other sources.

Significance after Mitigation

With implementation of Mitigation Measure AG-1b, the project applicant would be required to adhere to the terms of the comprehensive reclamation plan that would restore the project site to preexisting (pre-project) conditions following decommissioning of the project (after their use for solar generation activities). In addition, the proposed project would be required to implement a weed and pest management control plan per Mitigation Measure AG-2. Compliance with these measures would reduce this impact to a level less than significant.

3.3.4 Decommissioning/Restoration and Residual Impacts

Decommissioning/Restoration

If at the end of the PPA term, no contract extension is available for a power purchaser, no other buyer of the energy emerges, or there is no further funding of the project, the project will be decommissioned and dismantled. In any land restoration project, it is necessary to minimize disruption to topsoil or

stockpiled topsoil for later use during restoration following project decommissioning. With the implementation of the project, it is possible that the physical and chemical makeup of the soil materials within the upper soil horizon may change during construction and associated stockpiling operations. Improper soil stockpiling and management of the stockpiles could result in increased decomposition of soil organic materials, increased leaching of plant-available nitrogen, and depletion of soil biota communities (e.g., Rhizobium or Frankia). Each of these circumstances could have an adverse effect on the future productivity of the restored soils. Any reductions in agricultural productivity could significantly limit the types of crops (e.g., deeper rooting crops, orchards, etc.) that may be grown within the project site in the future. With implementation of Mitigation Measure AG-1b, the project applicant would be required to adhere to the terms of the comprehensive reclamation plan that would restore the project site to preexisting (pre-project) conditions following decommissioning of the project (after their use for solar generation activities). Implementation of Mitigation Measure AG-1b would reduce this impact to a level less than significant.

Residual

With mitigation, issues related to the conversion of Important Farmland to non-agricultural use would be mitigated and reduced to a less than significant level. Operation of the project, subject to the approval of a CUP, would generally be consistent with applicable federal, state, regional, and local plans and policies. Following the proposed use (e.g., solar facility), the project would be decommissioned and the project site would be restored to pre-project conditions. Based on these circumstances, the project would not result in any residual significant and unmitigable impacts on agricultural resources.

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3.4 Air Quality

This section includes an overview of the existing air quality within the project area and identifies applicable local, state, and federal policies related to air quality. The impact assessment provides an evaluation of potential adverse effects on air quality based on criteria derived from the CEQA Guidelines and ICAPCD's Air Quality Handbook in conjunction with actions proposed in Chapter 2, Project Description, of this EIR. Information contained in this section is summarized from the *Air Quality, Energy, and Greenhouse Gas Emissions Impact – Brawley Solar Energy Facility Project* prepared by Vista Environmental. This report is included in Appendix C of this EIR.

3.4.1 Existing Conditions

Regional Setting

The project is located in Imperial County within the Salton Sea Air Basin (SSAB). The SSAB consists of all of Imperial County and a portion of Riverside County. Both the ICAPCD and South Coast Air Quality Management District (SCAQMD) have jurisdiction within the SSAB. The ICAPCD has full jurisdiction within all Imperial County and SCAQMD only has jurisdiction within Riverside County.

The climate of Imperial County is governed by the large-scale sinking and warming of air in the semi-permanent high-pressure zone of the eastern Pacific Ocean. The high-pressure ridge blocks out most mid-latitude storms, except in the winter, when it is weakest and located farthest south. The coastal mountains prevent the intrusion of any cool, damp air found in California coastal areas. Because of the barrier and weakened storms, Imperial County experiences clear skies, extremely hot summers, mild winters, and little rainfall. The sun shines, on the average, more in Imperial County than anywhere else in the United States.

Winters are mild and dry with daily average temperatures ranging between 65- and 75- degrees Fahrenheit (°F). During winter months it is not uncommon to record maximum temperatures of up to 80 °F. Summers are extremely hot with daily average temperatures ranging between 104 and 115 °F. It is not uncommon to record maximum temperatures of 120 °F during summer months.

The flat terrain of the valley and the strong temperature differentials created by intense solar heating, produce moderate winds and deep thermal convection. The combination of subsiding air, protective mountains, and distance from the ocean all combine to severely limit precipitation. Rainfall is highly variable, with precipitation from a single heavy storm able to exceed the entire annual total during a later drought condition. The average annual rainfall is just over three 3 inches, with most of it occurring in late summer or mid-winter.

Humidity is low throughout the year, ranging from an average of 28 percent in summer to 52 percent in winter. The large daily oscillation of temperature produces a corresponding large variation in the relative humidity. Nocturnal humidity rises to 50 to 60 percent but drops to about 10 percent during the day.

The wind in Imperial County follows two general patterns. Wind statistics indicate prevailing winds are from the west-northwest through southwest; a secondary flow maximum from the southeast is also evident. The prevailing winds from the west and northwest occur seasonally from fall through spring and are known to be from the Los Angeles area. Occasionally, Imperial County experiences periods of extremely high wind speeds. Wind speeds can exceed 31 miles per hour (mph), and this occurs

most frequently during the months of April and May. However, speeds of less than 6.8 mph account for more than one-half of the observed wind measurements.

Major Air Pollutants

Criteria Pollutants

Criteria air pollutants are defined as those pollutants for which the federal and state governments have established air quality standards for outdoor or ambient concentrations to protect public health with a determined margin of safety. Ozone, coarse particulate matter (PM₁₀), and fine particulate matter (PM_{2.5}) are generally considered to be regional pollutants because they or their precursors affect air quality on a regional scale. Pollutants such as carbon monoxide (CO), nitrogen dioxide (NO₂), and sulfur dioxide (SO₂) are considered to be local pollutants because they tend to accumulate in the air locally. PM is also considered a local pollutant. Health effects commonly associated with criteria pollutants are summarized in Table 3.4-1.

Table 3.4-1. Criteria Air Pollutants - Summary of Common Sources and Effects

Pollutant	Major Manmade Sources	Human Health and Welfare Effects
СО	An odorless, colorless gas formed when carbon in fuel is not burned completely; a component of motor vehicle exhaust.	Reduces the ability of blood to deliver oxygen to vital tissues, effecting the cardiovascular and nervous system. Impairs vision, causes dizziness, and can lead to unconsciousness or death.
NO ₂	A reddish-brown gas formed during fuel combustion for motor vehicles, energy utilities and industrial sources.	Respiratory irritant; aggravates lung and heart problems. Precursor to ozone and acid rain. Causes brown discoloration of the atmosphere.
O ₃	Formed by a chemical reaction between reactive organic gases (ROGs) and nitrous oxides (N ₂ O) in the presence of sunlight. Common sources of these precursor pollutants include motor vehicle exhaust, industrial emissions, solvents, paints and landfills.	Irritates and causes inflammation of the mucous membranes and lung airways; causes wheezing, coughing and pain when inhaling deeply; decreases lung capacity; aggravates lung and heart problems. Damages plants; reduces crop yield.
PM ₁₀ and PM _{2.5}	Power plants, steel mills, chemical plants, unpaved roads and parking lots, woodburning stoves and fireplaces, automobiles and others.	Increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing; aggravated asthma; development of chronic bronchitis; irregular heartbeat; nonfatal heart attacks; and premature death in people with heart or lung disease. Impairs visibility (haze)
SO ₂	A colorless, nonflammable gas formed when fuel containing sulfur is burned. Examples are refineries, cement manufacturing, and locomotives.	Respiratory irritant. Aggravates lung and heart problems. Can damage crops and natural vegetation. Impairs visibility.

Source: California Air Pollution Control Officers Association (CAPCOA) 2021

Toxic Air Contaminants

In addition to the above-listed criteria pollutants, toxic air contaminants (TAC) are another group of pollutants of concern. TACs is a term that is defined under the California Clean Air Act and consists

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of the same substances that are defined as Hazardous Air Pollutants (HAPs) in the Federal Clean Air Act. There are over 700 hundred different types of TACs with varying degrees of toxicity. Sources of TACs include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. Cars and trucks release at least 40 different toxic air contaminants. The most important of these TACs, in terms of health risk, are diesel particulates, benzene, formaldehyde, 1,3-butadiene, and acetaldehyde. Public exposure to TACs can result from emissions from normal operations as well as from accidental releases. Health effects of TACs include cancer, birth defects, neurological damage, and death.

TACs are less pervasive in the urban atmosphere than criteria air pollutants, however they are linked to short-term (acute) or long-term (chronic or carcinogenic) adverse human health effects. There are hundreds of different types of TACs with varying degrees of toxicity. Sources of TACs include industrial processes, commercial operations (e.g., gasoline stations and dry cleaners), and motor vehicle exhaust.

According to *The California Almanac of Emissions and Air Quality 2013 Edition*, the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important of which is diesel particulate matter (DPM). DPM is a subset of PM_{2.5} because the size of diesel particles are typically 2.5 microns and smaller. Diesel engines emit a complex mixture of air pollutants, composed of gaseous and solid material. The visible emissions in diesel exhaust are known as particulate matter or PM, which includes carbon particles or "soot." Diesel exhaust also contains a variety of harmful gases and over 40 other cancer-causing substances. California's identification of DPM as a toxic air contaminant was based on its potential to cause cancer, premature deaths, and other health problems. Exposure to DPM is a health hazard, particularly to children whose lungs are still developing and the elderly who may have other serious health problems. Overall, diesel engine emissions are responsible for the majority of California's potential airborne cancer risk from combustion sources (Appendix C of this EIR).

Attainment Status

The U.S. Environmental Protection Agency (EPA) and CARB designate air basins or portions of air basins and counties as being in "attainment" or "nonattainment" for each of the criteria pollutants. Areas that do not meet the standards are classified as nonattainment areas. The National Ambient Air Quality Standards (NAAQS) (other than ozone [O₃], PM₁₀ and PM_{2.5} and those based on annual averages or arithmetic mean) are not to be exceeded more than once per year. The NAAQS for O₃, PM₁₀, and PM_{2.5} are based on statistical calculations over one- to three-year periods, depending on the pollutant. The California Ambient Air Quality Standards (CAAQS) are not to be exceeded during a three-year period.

The attainment status for the portion of the SSAB encompassing the project site is shown in Table 3.4-2. As shown, the Imperial County portion of the SSAB is currently designated as nonattainment for O_3 and PM_{10} under State standards. Under federal standards, the Imperial County portion of the SSAB is in nonattainment for O_3 , PM_{10} , and $PM_{2.5}$. The area is currently in attainment or unclassified status for CO, NO_2 , and SO_2 .

Table 3.4-2. Attainment Status of Criteria Pollutants in the Imperial County Portion of the Salton Sea Air Basin

Pollutant	State Designation	Federal Designation
O ₃	Nonattainment	Nonattainment
PM ₁₀	Nonattainment	Nonattainment
PM _{2.5}	Attainment	Nonattainment
СО	Attainment	Unclassified/attainment
NO ₂	Attainment	Unclassified/attainment
SO ₂	Attainment	Unclassified/attainment

Source: Appendix C of this EIR

Local Ambient Air Quality

Ambient air quality at the project site can be inferred from ambient air quality measurements conducted at nearby air quality monitoring stations. CARB maintains more than 60 monitoring stations throughout California. The ICAPCD operates a network of monitoring stations throughout the County that continuously monitor ambient levels of criteria pollutants in compliance with federal monitoring regulations.

Since not all air monitoring stations measure all of the tracked pollutants, the data from the following monitoring stations, listed in the order of proximity to the project site, have been used: Brawley-220 Main Street Monitoring Station (Brawley Station), Westmorland Monitoring Station (Westmorland Station) and El Centro – 9th Street Monitoring Station (El Centro Station).

The Brawley Station is located approximately 2.9 miles south of the project site at 220 Main Street, the Westmorland Station is located approximately 6.4 miles west of the project site at 202 W First Street, and the El Centro Station is located approximately 15.7 miles south of the project site at 150 9th Street. PM₁₀ and PM_{2.5} were measured at the Brawley Station, ozone was measured at the Westmorland Station, and NO₂ was measured at the El Centro Station. It should be noted that due to the air monitoring stations' distances from the project site, recorded air pollution levels at the air monitoring stations reflect with varying degrees of accuracy local air quality conditions at the project site. Table 3.4-3 shows the most recent three years of monitoring data from CARB.

Table 3.4-3. Summary of Local Ambient Air Quality Data

	Year ¹		
Pollutant (Standard)	2017	2018	2019
Ozone: 1			
Maximum 1-Hour Concentration (ppm)	0.078	0.086	0.071
Days > CAAQS (0.09 ppm)	0	0	0
Maximum 8-Hour Concentration (ppm)	0.067	0.068	0.060

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Table 3.4-3. Summary of Local Ambient Air Quality Data

	Year ¹		
Pollutant (Standard)	2017	2018	2019
Days > NAAQS (0.070 ppm)	0	0	0
Days > CAAQs (0.070 ppm)	0	0	0
Nitrogen Dioxide: ²			
Maximum 1-Hour Concentration (ppb)	48.8	34.1	41.4
Days > NAAQS (100 ppb)	0	0	0
Days > CAAQS (180 ppb)	0	0	0
Inhalable Particulates (PM10): ³			
Maximum 24-Hour National Measurement (ug/m³)	449.8	407.0	324.4
Days > NAAQS (150 ug/m³)	9	13	2
Days > CAAQS (50 ug/m³)	58	106	53
Annual Arithmetic Mean (AAM) (ug/m³)	45.4	52.2	35.8
Annual > NAAQS (50 ug/m³)	No	Yes	No
Annual > CAAQS (20 ug/m³)	Yes	Yes	Yes
Ultra-Fine Particulates (PM2.5): ³			
Maximum 24-Hour National Measurement (ug/m³)	46.1	55.1	28.9
Days > NAAQS (35 ug/m³)	1	2	0
Annual Arithmetic Mean (AAM) (ug/m³)	9.4	10.4	8.3
Annual > NAAQS and CAAQS (12 ug/m³)	No	No	No
Annual > NAAQS and CAAQS (12 ug/m³)	No	No	No

Source: Appendix C of this EIR

Notes:

Exceedances are listed in **bold**. CAAQS = California Ambient Air Quality Standard; NAAQS = National Ambient Air Quality Standard; ppm = parts per million; ppb = parts per billion; ND = no data available.

Sensitive Receptors

High concentrations of air pollutants pose health hazards for the general population, but particularly for the young, the elderly, and the sick. Typical health problems attributed to smog include respiratory ailments, eye and throat irritations, headaches, coughing, and chest discomfort. Certain land uses are considered to be more sensitive to the effects of air pollution. Schools, hospitals, residences, and other

¹ Data obtained from the Westmorland Station.

² Data obtained from the El Centro Station.

³ Data obtained from the Brawley Station.

facilities where people congregate, especially children, the elderly and infirm, are considered particularly sensitive to air pollutants.

The nearest sensitive receptors to the project site including the following:

- Single-family homes approximately 40 feet to the north side of the project site, located near the northwest corner of the project site.
- Single-family residence on the east side of N Best Avenue, located near the northeast corner of the project site
- Single-family residence on the east side of N Best Avenue, located across the proposed project's primary access road
- Two single-family residences located at the northeast corner of the intersection of N Best Avenue and Ward Road
- Single-family residence (with a horse boarding/training facility) on the west side of N Best Avenue, located south of the project site)

3.4.2 Regulatory Setting

This section identifies and summarizes federal, state, and local laws, policies, and regulations that are applicable to the project.

Federal

Clean Air Act

The CAA, passed in 1970 and last amended in 1990, is the primary federal law that governs air quality. The Federal CAA delegates primary responsibility for clean air to the U.S. EPA. The U.S. EPA develops rules and regulations to preserve and improve air quality and delegates specific responsibilities to state and local agencies. Under the act, the U.S. EPA has established the NAAQS for six criteria air pollutants that are pervasive in urban environments and for which state and national health-based ambient air quality standards have been established. Ozone, CO, NO₂, SO₂, Pb, and PM (Including both PM₁₀, and PM_{2.5}) are the six criteria air pollutants. Ozone is a secondary pollutant, nitrogen oxides (NO_x) and volatile organic compounds (VOC) are of particular interest as they are precursors to ozone formation. In addition, national standards exist for Pb. The NAAQS standards are set at levels that protect public health with a margin of safety and are subject to periodic review and revision.

The Federal CAA requires U.S EPA to designate areas as attainment, nonattainment, or maintenance (previously nonattainment and currently attainment) for each criteria pollutant based on whether the NAAQS have been achieved. The federal standards are summarized in Table 3.4-4.

State

California Clean Air Act

The California Clean Air Act (CCAA) was adopted by CARB in 1988. The CCAA is responsible for meeting the state requirements of the Federal CAA and for establishing the CAAQS. CARB oversees the functions of local air pollution control districts and air quality management districts, which, in turn,

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administer air quality activities at the regional and county levels. The CCAA, as amended in 1992, requires all air districts of the state to achieve and maintain the CAAQS by the earliest practical date.

The CCAA requires CARB to designate areas within California as either attainment or nonattainment for each criteria pollutant based on whether the CAAQS have been achieved. Under the CCAA, areas are designated as nonattainment for a pollutant if air quality data shows that a state standard for the pollutant was violated at least once during the previous 3 calendar years. As shown in Table 3.4-4, the CAAQS are generally more stringent than the corresponding federal standards and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. Exceedances that are affected by highly irregular or infrequent events are not considered violations of a state standard and are not used as a basis for designating areas as nonattainment.

California State Implementation Plan

The CAA mandates that the state submit and implement a SIP for areas not meeting the NAAQS. These plans must include pollution control measures that demonstrate how the standards will be met. State law makes CARB the lead agency for all purposes related to the SIP. Local air districts and other agencies prepare SIP elements and submit them to CARB for review and approval. CARB then forwards SIP revisions to the U.S. EPA for approval and publication in the Federal Register. The Code of Federal Regulations Title 40, Chapter I, Part 52, Subpart F, Section 52.220 lists all of the items which are included in the California SIP.

Table 3.4-4. Ambient Air Quality Standards

Air Pollutant	Averaging Time	California Standard	National Standard
O ₃	1-hour	0.09 ppm	
	8-hour	0.070 ppm	0.070 ppm
PM ₁₀	24-hour Mean	50 μg/m ³	150 μg/m ³
		20 μg/m ³	
PM _{2.5}	24-hour Mean		35 μg/m³
		12 μg/m³	12.0 μg/m ³
СО	1-hour 8-hour	20 ppm	35 ppm
		9.0 ppm	9 ppm
NO ₂	1-hour Mean	0.18 ppm	100 ppb
		0.030 ppm	0.053 ppm
SO ₂	1-hour 24-hour	0.25 ppm	75 ppb
		0.04 ppm	
Pb	30-day Rolling 3-month	1.5 μg/m ³	
			0.15 μg/m³
Sulfates	24-hour	25 μg/m³	No federal standard
Hydrogen sulfide	1-hour	0.03 ppm	

Table 3.4-4. Ambient Air Quality Standards

Air Pollutant	Averaging Time	California Standard	National Standard
Vinyl chloride	24-hour	0.01 ppm	
Visibility-reducing particles	8-hour	Extinction coefficient of 0.23 per kilometer, visibility of 10 miles or more because of particles when relative humidity is less than 70 percent	

Source: CARB 2016

Notes:

CO – carbon monoxide; mean – annual arithmetic mean; NO_2 – nitrogen dioxide; O_3 – ozone; Pb – lead; $PM_{2.5}$ – particulate matter less than 2.5 microns in diameter; PM_{10} - particulate matter less than 10 microns in diameter; PD_1 – parts per billion; PD_2 – sulfur dioxide; PD_3 – micrograms per cubic meter

Toxic Air Contaminants Regulation

TAC sources include industrial processes, dry cleaners, gasoline stations, paint and solvent operations, and fossil fuel combustion sources. The TACs that are relevant to the implementation of the project include DPM and airborne asbestos.

In August 1998, CARB identified DPM emissions from diesel-fueled engines as a TAC. In September 2000, CARB approved a comprehensive diesel risk reduction plan to reduce emissions from both new and existing diesel fueled engines and vehicles. The goal of the plan is to reduce diesel PM₁₀ (inhalable particulate matter) emissions and the associated health risk by 75 percent in 2010 and by 85 percent by 2020. The plan identified 14 measures that target new and existing on-road vehicles (e.g., heavy duty trucks and buses, etc.), off-road equipment (e.g., graders, tractors, forklifts, sweepers, and boats), portable equipment (e.g., pumps, etc.), and stationary engines (e.g., stand-by power generators, etc.).

Tanner Air Toxics Act & Air Toxics "Hot Spots" Information and Assessment Act

CARB's Statewide comprehensive air toxics program was established in 1983 with AB 1807, the Toxic Air Contaminant Identification and Control Act (Tanner Air Toxics Act of 1983). AB 1807 created California's program to reduce exposure to air toxics and sets forth a formal procedure for CARB to designate substances as TACs. Once a TAC is identified, CARB adopts an airborne toxics control measure (ATCM) for sources that emit designated TACs. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure to below that threshold. If there is no safe threshold, the measure must incorporate toxics best available control technology to minimize emissions.

CARB also administers the state's mobile source emissions control program and oversees air quality programs established by state statute, such as AB 2588, the Air Toxics "Hot Spots" Information and Assessment Act of 1987. Under AB 2588, TAC emissions from individual facilities are quantified and prioritized by the air quality management district or air pollution control district. High priority facilities are required to perform a health risk assessment (HRA) and, if specific thresholds are exceeded, required to communicate the results to the public in the form of notices and public meetings. In

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September 1992, the "Hot Spots" Act was amended by SB 1731, which required facilities that pose a significant health risk to the community to reduce their risk through a risk management plan.

Regional

Imperial County Air Pollution Control District

The ICAPCD is the agency responsible for monitoring air quality, as well as planning, implementing, and enforcing programs designed to attain and maintain state and federal ambient air quality standards in the district. ICAPCD is responsible for regulating stationary sources of air emissions in Imperial County. Stationary sources that have the potential to emit air pollutants into the ambient air are subject to the Rules and Regulations adopted by ICAPCD. ICAPCD is responsible for establishing stationary source permitting requirements and for ensuring that new, modified, or relocated stationary sources do not create net emission increases. Monitoring of ambient air quality in Imperial County began in 1976. Since that time, monitoring has been performed by ICAPCD, CARB, and by private industry. There are six monitoring sites in Imperial County from Niland to Calexico. The ICAPCD has developed the following plans to achieve attainment for air quality ambient standards.

- **2009 Imperial County Plan for PM**₁₀. Imperial Valley is classified as nonattainment for federal and state PM₁₀ standards. As a result, ICAPCD was required to develop a PM₁₀ Attainment Plan. The final plan was adopted by ICAPCD on August 11, 2009 (ICAPCD 2009).
- 2013 Imperial County Plan for 2006 24-hour PM_{2.5} for Moderate Nonattainment Area. U.S. EPA designated Imperial County as nonattainment for the 2006 24-hr PM_{2.5} standard, effective December 14, 2009. The 2013 PM_{2.5} SIP demonstrates attainment of the 2006 PM_{2.5} NAAQS "but-for" transport of international emissions from Mexicali, Mexico. The City of Calexico, California shares a border with the City of Mexicali. Effective July 1, 2014, the City of Calexico was designated nonattainment, while the rest of the SSAB was designated attainment (ICAPCD 2014).
- 2017 Imperial County Plan for 2008 8-hour Ozone Standard. Because of Imperial County's "moderate" nonattainment status for 2008 federal 8-hour O₃ standards, ICAPCD was required to develop an 8-hour Attainment Plan for Ozone (ICAPCD 2017a). The plan includes control measures which are an integral part of how the ICAPCD currently controls the ROG and NO_X emissions within the O₃ nonattainment areas. The overall strategy includes programs and control measures which represent the implementation of Reasonable Available Control Technology (40 CFR 51.912) and the assurance that stationary sources maintain a net decrease in emissions.
- 2018 Imperial County Plan for PM₁₀. Imperial Valley is classified as nonattainment for federal and state PM₁₀ standards. The 2018 SIP maintained previously adopted fugitive dust control measures (Regulation VIII) that were approved in the Imperial County portion of the California SIP in 2013 (see above) (ICAPCD 2018a).
- 2018 Imperial County Plan for PM_{2.5}. U.S. EPA designated Imperial County as nonattainment for the 2018 24-hr PM_{2.5} standard. The 2018 PM_{2.5} SIP concluded that the majority of the PM_{2.5} emissions resulted from transport in nearby Mexico. Specifically, the SIP demonstrates attainment of the 2006 PM_{2.5} NAAQS "but for" transport of international emissions from Mexicali, Mexico. In accordance with the CCAA, the PM_{2.5} SIP satisfies the attainment demonstration requirement satisfying the provisions of the CCAA (ICAPCD 2018b).

In addition to the above plans, the ICAPCD is working cooperatively with counterparts from Mexico to implement emissions reductions strategies and projects for air quality improvements at the border. The two countries strive to achieve these goals through local input from states, county governments, and citizens. Within the Mexicali and Imperial Valley area, the Air Quality Task Force has been organized to address those issues unique to the border region known as the Mexicali/Imperial air shed. The Air Quality Task Force membership includes representatives from federal, State, and local governments from both sides of the border, as well as representatives from academia, environmental organizations, and the general public. This group was created to promote regional efforts to improve the air quality monitoring network, emissions inventories, and air pollution transport modeling development, as well as the creation of programs and strategies to improve air quality.

Imperial County Air Pollution Control District Rules and Regulations

ICAPCD has the authority to adopt and enforce regulations dealing with controls for specific types of sources, emissions or hazardous air pollutants, and New Source Review. The ICAPCD Rules and Regulations are part of the SIP and are separately enforceable by the EPA.

Rule 106 – Abatement. The Board may, after notice and a hearing, issue, or provide for the issuance by the Hearing Board, of an order for abatement whenever the District finds that any person is in violation of the rules and regulations limiting the discharge of air contaminants into the atmosphere.

Rule 107 – Land Use. The purpose of this rule is to provide ICAPCD the duty to review and advise the appropriate planning authorities within the District on all new construction or changes in land use which the Air Pollution Control Officer believes could become a source of air pollution problems.

Rule 201 – Permits Required. The construction, installation, modification, replacement, and operation of any equipment which may emit or control Air Contaminants require ICAPCD permits.

Rule 207 – New and Modified Stationary Source Review. Establishes preconstruction review requirements for new and modified stationary sources to ensure the operations of equipment does not interfere with attainment or maintenance of ambient air quality standards.

Rule 208 – Permit to Operate. The ICAPCD would inspect and evaluate the facility to ensure the facility has been constructed or installed and will operate to comply with the provisions of the Authority to Construct permit and comply with all applicable laws, rules, standards, and guidelines.

Rule 310 – Operational Development Fee. The purpose of this rule is to provide ICAPCD with a sound method for mitigating the emissions produced from the operation of new commercial and residential development projects throughout the County of Imperial and incorporated cities. All project proponents have the option to either provide off-site mitigation, pay the operational development fee, or do a combination of both. This rule will assist ICAPCD in attaining the state and federal ambient air quality standards for PM₁₀ and O₃.

Rule 401 – Opacity of Emissions. Sets limits for release or discharge of emissions into the atmosphere, other than uncombined water vapor, that are dark or darker in shade as designated as No.1 on the Ringelmann Chart¹ or obscure an observer's view to a degree equal to or greater than smoke does as compared to No.1 on the Ringelmann Chart, for a period or aggregated period of more than three minutes in any hour.

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¹ The Ringelmann scale is a scale for measuring the apparent density or opacity of smoke.

Rule 403 – General Limitations on the Discharge of Air Contaminants. Rule 403 sets forth limitations on emissions of pollutants, including particulate matter, from individual sources.

Rule 407 – Nuisance. Rule 407 prohibits a person from discharging from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

Rule 801 – Construction and Earthmoving Activities. Rule 801 aims to reduce the amount of PM_{10} entrained in the ambient air as a result of emissions generated from construction and other earthmoving activities by requiring actions to prevent, reduce, or mitigate PM_{10} emissions. This rule applies to any construction and other earthmoving activities, including, but not limited to, land clearing, excavation related to construction, land leveling, grading, cut and fill grading, erection or demolition of any structure, cutting and filling, trenching, loading or unloading of bulk materials, demolishing, drilling, adding to or removing bulk of materials from open storage piles, weed abatement through disking, back filling, travel on-site and travel on access roads to and from the site.

Regulation VIII – Fugitive Dust Rules. Regulation VIII sets forth rules regarding the control of fugitive dust, including fugitive dust from construction activities. The regulation requires implementation of fugitive dust control measures to reduce emissions from earthmoving, unpaved roads, handling of bulk materials, and control of track-out/carry-out dust from active construction sites. Best Available Control Measures to reduce fugitive dust during construction and earthmoving activities include but are not limited to:

- Phasing of work in order to minimize disturbed surface area
- Application of water or chemical stabilizers to disturbed soils
- Construction and maintenance of wind barriers
- Use of a track-out control device or wash down system at access points to paved roads.

Compliance with Regulation VIII is mandatory for all construction sites, regardless of size; however, compliance with Regulation VIII does not constitute mitigation under the reductions attributed to environmental impacts. In addition, compliance for a project includes: (1) the development of a dust control plan for the construction and operational phase; and (2) notification to the Air District is required 10 days prior to the commencement of any construction activity. Furthermore, any use of engine(s) and/or generator(s) of 50 horsepower or greater may require a permit through ICAPCD.

Southern California Association of Governments – 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy

The Southern California Association of Governments (SCAG) is the designated metropolitan planning organization for Los Angeles, Ventura, Orange, San Bernardino, Riverside, and Imperial Counties. CEQA requires that regional agencies like SCAG review projects and plans throughout its jurisdiction. SCAG, as the region's "Clearinghouse," collects information on projects of varying size and scope to provide a central point to monitor regional activity. SCAG has the responsibility of reviewing dozens of projects, plans, and programs every month. Projects and plans that are regionally significant must demonstrate to SCAG their consistency with a range of adopted regional plans and policies.

On September 3, 2020, SCAG adopted the 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) (SCAG 2020). The RTP/SCS or "Connect SoCal" includes a strong

commitment to reduce emissions from transportation sources to comply with Senate Bill 375, improve public health, and meet the NAAQS as set forth by the federal CAA. The following SCAG goal is applicable to the project:

Reduce greenhouse gas emissions and improve air quality.

Imperial County General Plan

The Imperial County General Plan serves as the overall guiding policy for the County. The Conservation and Open Space Element includes objectives for helping the County achieve the goal of improving and maintaining the quality of air in the region. Table 3.4-5 summarizes the project's consistency with the applicable air quality goal and objectives from the Conservation and Open Space Element. While this EIR analyzes the project's consistency with the General Plan pursuant to State CEQA Guidelines Section 15125(d), the Imperial County Board of Supervisors ultimately determines consistency with the General Plan.

Table 3.4-5. Project Consistency with Applicable Plan Policies

Applicable Policies	Consistency Determination	Analysis			
Conservation and Open Space Element	Conservation and Open Space Element				
Protection of Air Quality and Addressing Climate Change Goal 7: The County shall actively seek to improve the quality of air in the region.	Consistent	The proposed project would be required to comply with all applicable ICAPCD rules and requirements during construction and operation to reduce air emissions. Overall, the proposed project would improve air quality and reduce GHG emissions by reducing the amount of emissions that would be generated in association with electricity production from fossil fuel burning facilities. Therefore, the proposed project is consistent with this goal.			
Objective 7.1: Ensure that all project and facilities comply with current Federal, State and local requirements for attainment of air quality objectives.	Consistent	The proposed project would comply with current federal and State requirements for attainment for air quality objectives through conformance with all applicable ICAPCD rules and requirements to reduce fugitive dust and emissions. Further, the project would comply with the ICAPCD Air Quality CEQA Handbook's Mandatory Standard Measures (Applicant Proposed Measure AQ-1). Therefore, the proposed project is consistent with this objective.			
Objective 7.2: Develop management strategies to mitigate fugitive dust. Cooperate with all federal and state agencies in the effort to attain air quality objectives.	Consistent	The Applicant would cooperate with all federal and State agencies in the effort to attain air quality objectives through compliance with the ICAPCD Air Quality CEQA Handbook's Mandatory Standard Measures (Applicant Proposed Measure AQ-1). Therefore, the proposed project is consistent with this objective.			

Source: County of Imperial 2016

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3.4.3 Impacts and Mitigation Measures

This section presents the significance criteria used for considering project impacts related to air quality, the methodology employed for the evaluation, an impact evaluation, and mitigation requirements, if necessary.

Thresholds of Significance

Based on CEQA Guidelines Appendix G, project impacts related to air quality are considered significant if any of the following occur:

- 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 non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for O₃ precursors)
- Expose sensitive receptors to substantial pollutant concentrations
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people

Imperial County Air Pollution Control District

ICAPCD amended the *Air Quality Handbook: Guidelines for the Implementation of CEQA* on December 12, 2017 (ICAPCD 2017b). ICAPCD established significance thresholds based on the state CEQA thresholds. The handbook was used to determine the proper level of analysis for the project.

OPERATIONS

Air quality analyses should compare all operational emissions of a project, including motor vehicle, area source, and stationary or point sources to the thresholds in Table 3.4-6. Projects can be classified as either Tier 1 or Tier 2 projects, depending on the project's operational emissions. As shown in Table 3.4-6, Tier 1 projects are projects that emit less than 137 pounds per day of nitrogen oxide (NOx) or reactive organic gases (ROGs); less than 150 pounds per day of PM10 or SOx; or less than 550 pounds per day of CO or PM_{2.5}.

Tier 1 projects are not required to develop a Comprehensive Air Quality Analysis Report or an EIR, and require the implementation of all feasible mitigation measures listed in Section 7.2 of the ICAPCD's Air Quality Handbook (ICAPCD 2017b). Alternatively, Tier 2 projects are projects that emit 137 pounds per day of NOx or ROG or greater; 150 pounds per day of PM₁₀ or SOx or greater; or 550 pounds per day of CO or PM_{2.5} or greater. Tier 2 projects are required to develop a Comprehensive Air Quality Analysis Report at a minimum, and are required to implement all standard mitigation measures as well as all feasible discretionary mitigation measures listed in Sections 7.2 and 7.3 of the ICAPCD's Air Quality Handbook (ICAPCD 2017b).

Table 3.4-6. Imperial County Air Pollution Control District Significance Thresholds for Operation

Criteria Pollutant	Tier 1 Thresholds	Tier 2 Thresholds
NO _x and ROG	Less than 137 pounds per day	137 pounds per day and greater

Table 3.4-6. Imperial County Air Pollution Control District Significance Thresholds for Operation

Criteria Pollutant	Tier 1 Thresholds	Tier 2 Thresholds
PM ₁₀ and SO ₂	Less than 150 pounds per day	150 pounds per day and greater
CO and PM _{2.5}	Less than 550 pounds per day	550 pounds per day and greater
Level of Significance	Less than Significant	Significant Impact

Source: ICAPCD 2017b

CO – carbon monoxide; NO_x – nitrogen oxide; O_3 – ozone; Pb – lead; $PM_{2.5}$ – particulate matter less than 2.5 microns in diameter; PM_{10} - particulate matter less than 10 microns in diameter; PM_{10} - reactive organic gas; PM_{10} - sulfur oxide

CONSTRUCTION

For construction projects, the *Air Quality Handbook* indicates that the significance threshold for NO_x is 100 pounds per day and for ROG is 75 pounds per day. As discussed in the ICAPCD's *Air Quality Handbook*, the approach to evaluating construction emissions should be qualitative rather than quantitative. In any case, regardless of the size of the project, the standard mitigation measures for construction equipment and fugitive PM₁₀ must be implemented at all construction sites. The implementation of discretionary mitigation measures, as listed in Section 7.1 of the ICAPCD's *Air Quality Handbook*, apply to those construction sites that are 5 acres or more for non-residential developments or 10 acres or more in size for residential developments. The mitigation measures found in Section 7.1 of the ICAPCD's handbook are intended as a guide of feasible mitigation measures and are not intended to be an all-inclusive comprehensive list of all mitigation measures. Table 3.4-7 presents the construction emission thresholds that are identified by ICAPCD.

Table 3.4-7. Imperial County Air Pollution Control District Significance Thresholds for Construction Activities

Pollutant	Thresholds
PM ₁₀	150 pounds per day
ROG	75 pounds per day
NO _X	100 pounds per day
СО	550 pounds per day

Source: ICAPCD 2017b

CO – carbon monoxide; NO_x – nitrogen oxide; PM_{10} - particulate matter less than 10 microns in diameter; ROG - reactive organic gas

Diesel Toxic Risk Thresholds

There are inherent uncertainties in risk assessment with regard to the identification of compounds as causing cancer or other health effects in humans, the cancer potencies and reference exposure levels of compounds, and the exposure that individuals receive. It is common practice to use conservative (health protective) assumptions with respect to uncertain parameters. The

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uncertainties and conservative assumptions must be considered when evaluating the results of risk assessments.

There is debate as to the appropriate levels of risk assigned to diesel particulates. The U.S. EPA has not yet declared diesel particulates as a toxic air contaminant. Using the CARB threshold, a risk concentration of one in one million (1:1,000,000) per micrograms per cubic meter (μ g/m³) of continuous 70-year exposure is considered less than significant.

Methodology

The analysis criteria for air quality impacts are based on the approach and methods discussed in the ICAPCD's *Air Quality Handbook*. The proposed project would result in both short-term and long-term emissions of air pollutants associated with construction and operation of the proposed project.

Construction emissions would include exhaust from the operation of conventional construction equipment, on-road emissions from employee vehicle trips and haul truck trips, fugitive dust as a result of grading, and vehicle travel on paved and unpaved surfaces.

Once fully constructed, the proposed project would be operated on an unstaffed basis and be monitored remotely from the Brawley Geothermal Power Plant control room, with periodic on-site personnel visitations for security, maintenance and system monitoring. Therefore, no full-time site personnel would be required on-site during operations and employees would only be on-site up to four times per year to wash the panels. As the project's PV arrays produce electricity passively, maintenance requirements are anticipated to be very minimal. Any required planned maintenance activities would generally consist of equipment inspection and replacement and would be scheduled to avoid peak load periods. Any unplanned maintenance would be responded to as needed, depending on the event. Operational emissions would include vehicle trips from employees who commute to and from the project site (i.e., to control site operation and perform equipment maintenance).

The ICAPCD's *Air Quality Handbook* establishes aggregate emission calculations for determining the potential significance of a project. In the event that the emissions exceed the established thresholds (Table 3.4-6 and Table 3.4-7), air dispersion modeling may be conducted to assess whether the project results in an exceedance of an air quality standard.

An air quality technical report was prepared by Vista Environmental (Appendix C of this EIR). This report was used in the evaluation of project-related construction and operational air quality impacts. The emissions of criteria air pollutants were estimated using methodologies recommended by the ICAPCD. Where criteria air pollutant quantification was required, emissions were modeled using the California Emissions Estimator Model (CalEEMod), version 2020.4.0.2 Project construction-generated air pollutant emissions were calculated using CalEEMod model defaults, with some refinements, for Imperial County as well as timing and equipment identified by the project proponent. The following On-Road Fugitive Dust construction parameters were revised in the CalEEMod model: (1) The percent on-road pavement was changed to 85 percent to account for Best Avenue that is adjacent to the project site being paved; and (2) The Material Silt Content was changed to 3 percent in order to account for ICAPCD Rule 805 F.1.c that requires the installation of gravel or other low silt material with less than 5 percent silt content on all onsite roads. Operational air pollutant emissions were based on the project site plan. Associated emissions calculations and assumptions are included in Appendix C of this EIR.

² CalEEMod is a statewide land use emissions computer model designed to quantify potential criteria pollutant emissions associated with both construction and operations from a variety of land use projects.

The air quality impacts are mainly attributable to construction phases of the project, including site preparation, facility installation, and gen-tie and site restoration. Operational impacts include inspection and maintenance operations, which includes washing of the solar panels.

Impact Analysis

Impact 3.4-1 Would the project conflict with or obstruct implementation of the applicable air quality plan?

The air quality attainment plan (AQAP) for the SSAB, through the implementation of the air quality management plan (AQMP) (previously AQAP) and SIP for PM₁₀, sets forth a comprehensive program that will lead the SSAB into compliance with all federal and state air quality standards. The AQMP control measures and related emission reduction estimates are based upon emissions projections for a future development scenario derived from land use, population, and employment characteristics defined in consultation with local governments. Conformance with the AQMP for development projects is determined by demonstrating compliance with local land use plans and/or population projections, meeting the land use designation set forth in the local General Plan, and comparing assumed emissions in the AQMP to proposed emissions.

The project must demonstrate compliance with all ICAPCD applicable rules and regulations, as well as local land use plans and population projections. As the project does not contain a residential component, the project would not result in an increase in the regional population. While the project would contribute to energy supply, which is one factor of population growth, the proposed project is a solar energy project and would not significantly increase employment or growth within the region. Moreover, development of the proposed project would increase the amount of renewable energy and help California meet its RPS.

As shown in Table 3.4-5, the project is consistent with the applicable air quality goal and objectives from the Conservation and Open Space Element of the General Plan. The proposed project would be required to comply with all applicable ICAPCD rules and requirements during construction and operation to reduce air emissions. Overall, the proposed project would improve air quality by reducing the amount of emissions that would be generated in association with electricity production from fossil fuel burning facilities.

Furthermore, the thresholds of significance adopted by the air district (ICAPCD), determine compliance with the goals of the attainment plans in the region. As such, emissions below the ICAPCD regional mass daily emissions thresholds presented in Table 3.4-6 and Table 3.4-7 would not conflict with or obstruct implementation of the applicable air quality plans. The following analysis is broken out by a discussion of potential impacts during construction of the project followed by a discussion of potential impacts during operation of the project.

Construction Emissions. Air emissions are generated during construction through activities. Two basic sources of short-term emissions will be generated through project construction: operation of heavy-duty equipment (i.e., excavators, loaders, haul trucks) and the creation of fugitive dust during clearing and grading. Construction activities such as excavation and grading operations, construction vehicle traffic, and wind blowing over exposed soils would generate exhaust emissions and fugitive PM emissions that affect local air quality at various times during construction. Construction emissions vary from day-to-day depending on the number of workers, number, and types of active heavy-duty vehicles and equipment, level of activity, the prevailing meteorological conditions, and the length over which these activities occur.

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The proposed project is anticipated to take approximately 8 months from the commencement of the construction process to complete. Construction activities would primarily involve demolition and grubbing, grading of the project site to establish access roads and pads for electrical equipment, trenching for underground electrical collection lines, and the installation of solar equipment and security fencing. The construction emissions were calculated using the CARB-approved CalEEMod computer program, which is designed to model emissions for land use development projects, based on typical construction requirements. Table 3.4-8 shows the maximum summer or winter daily emissions for each year of construction activities for the proposed project with implementation of ICAPCD's standard measures for fugitive dust (PM₁₀) control and standard mitigation measures for construction combustion equipment from the ICAPCD's CEQA Air Quality Handbook (ICAPCD 2017b). These standard mitigation measures are identified in Applicant Proposed Measure (APM) AQ-1.

As shown in Table 3.4-8, with implementation of APM AQ-1, the project's daily construction emissions would not exceed the ICAPCD thresholds for ROG, NOx, CO, SO₂, PM₁₀, and PM_{2.5}. Although the proposed project would not exceed the ICAPCD threshold for NO_x, the project applicant would implement APM AQ-2, which requires the construction equipment list to be submitted periodically to ICAPCD to perform a NO_x analysis to verify that equipment use does not exceed significance thresholds. To further reduce dust emissions during project construction, the project applicant will implement APM AQ-3, which limits the speed of all vehicles operating onsite on dirt roads to 15 miles per hour or less. Implementation of APM AQ-1 through AQ-3 would provide reduction strategies to further improve air quality and ensure that this potential impact would remain less than significant.

Table 3.4-8. Project Construction-Generated Emissions with Implementation of Imperial County Air Pollution Control District's Standard Measures for Fugitive Dust (PM₁₀) Control and Standard Mitigation Measures for Construction Combustion Equipment

	Pollutant (pounds per day)					
Construction Year	ROG	NO _x	со	SO ₂	PM ₁₀	PM _{2.5}
2021	6.11	51.82	39.73	0.08	67.20	12.54
2022	4.57	39.74	36.41	0.12	128.90	14.44
Maximum Daily Emissions	6.11	51.82	39.73	0.12	128.90	14.44
ICAPCD Significance Threshold	75	100	550	_	150	_
Exceed ICAPCD Significance Threshold?	No	No	No	No	No	No

Source: Appendix C of this EIR

Operational Emissions. The proposed project requires minimal operations and maintenance activities conducted by two employees. Project-generated increases in emissions would be predominately associated with motor vehicle use for routine maintenance work and site security as well as panel upkeep and cleaning. Long-term operational emissions attributable to the project are identified in Table 3.4-9 and compared to the operational significance thresholds promulgated by the ICAPCD.

Table 3.4-9. Project Operational Emissions

	Pollutant (pounds per day)					
Activity	ROG	NOx	со	SO ₂	PM ₁₀	PM _{2.5}
Area Sources ¹	5.35	0.00	0.04	0.00	0.00	0.00
Energy Usage ²	0.00	0.00	0.00	0.00	0.00	0.00
Mobile Sources ³	0.17	0.18	1.31	0.00	2.35 32.91	0.27 <u>3.78</u>
Backup Generator ⁴	0.05	0.17	0.18	0.00	0.01	0.01
Total Emissions	5.57	0.35	1.53	0.00	2.35 32.92	0.28 3.78
ICAPCD Significance Threshold	137	137	150	550	550	150
Exceed ICAPCD Significance Threshold?	No	No	No	No	No	No

Source: Appendix C of this EIR

Notes:

- ¹ Area sources consist of emissions from consumer products, architectural coatings, and landscaping equipment.
- ² Energy usage consist of emissions from natural gas usage (no natural gas usage during operation of the project).
- ³ Mobile sources consist of emissions from vehicles and road dust.
- ⁴ Backup Generator based on a 20 kW (62 Horsepower) diesel generator that has a cycling schedule of 30 minutes per week.

As shown in Table 3.4-9, the project's operational emissions would not exceed the ICAPCD thresholds for CO, ROG, NOx, PM₁₀ and PM_{2.5}. The proposed project will be required to implement all of the ICAPCD Regulation VIII, fugitive dust control measures during construction and operation of the proposed project. Furthermore, any stationary sources of emissions operated on site will be required to adhere to ICAPCD Rule 207, New and Modified Stationary Source Review and Rule 201 that require permits to construct and operate stationary sources. Although no significant air quality impact would occur during operation, the project applicant is required to submit a Dust Suppression Management Plan for both construction and operation in order to reduce fugitive dust emissions. Implementation of APM AQ-4 through AQ-6 would ensure that a Dust Suppression Management Plan is implemented, thereby ensuring that this potential impact would remain less than significant. To further reduce dust emissions during operation of the project, the project applicant will implement APM AQ-3, which limits the speed of all vehicles operating onsite on dirt roads to 15 miles per hour or less.

As described above, conformance with the AQMP for development projects is determined by demonstrating compliance with local land use plans and/or population projections and comparing assumed emissions in the AQMP to proposed emissions. Because the proposed project complies with local land use plans and population projections and would not exceed ICAPCD's regional mass daily emissions thresholds during construction and operation, the proposed project would not conflict with or obstruct implementation of the applicable air quality plan. This is considered a less than significant impact.

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Applicant Proposed Measure(s)

AQ-1 Fugitive Dust Control. Pursuant to ICAPCD, all construction sites, regardless of size, must comply with the requirements contained within Regulation VIII – Fugitive Dust Control Measures. ICAPCD will verify implementation and compliance with these measures as part of the grading permit review/approval process.

ICAPCD Standard Measures for Fugitive Dust (PM₁₀) Control

- All disturbed areas, including bulk material storage, which is not being actively
 utilized, shall be effectively stabilized and visible emissions shall be limited to no
 greater than 20 percent opacity for dust emissions by using water, chemical
 stabilizers, dust suppressants, tarps, or other suitable material, such as vegetative
 ground cover.
- All on-site and offsite unpaved roads will be effectively stabilized, and visible emissions shall be limited to no greater than 20 percent opacity for dust emissions by paving, chemical stabilizers, dust suppressants, and/or watering.
- All unpaved traffic areas 1 acre or more with 75 or more average vehicle trips per day will be effectively stabilized and visible emissions shall be limited to no greater than 20 percent opacity for dust emissions by paving, chemical stabilizers, dust suppressants, and/or watering.
- The transport of bulk materials shall be completely covered unless 6 inches of freeboard space from the top of the container is maintained with no spillage and loss of bulk material. In addition, the cargo compartment of all haul trucks is to be cleaned and/or washed at delivery site after removal of bulk material.
- All track-out or carry-out will be cleaned at the end of each workday or immediately
 when mud or dirt extends a cumulative distance of 50 linear feet or more onto a
 paved road within an urban area.
- Movement of bulk material handling or transfer shall be stabilized prior to handling
 or at points of transfer with application of sufficient water, chemical stabilizers, or
 by sheltering or enclosing the operation and transfer line.
- The construction of any new unpaved road is prohibited within any area with a
 population of 500 or more unless the road meets the definition of a temporary
 unpaved road. Any temporary unpaved road shall be effectively stabilized, and
 visible emissions shall be limited to no greater than 20 percent opacity for dust
 emission by paving, chemical stabilizers, dust suppressants, and/or watering.

Standard Mitigation Measures for Construction Combustion Equipment

- Use of alternative fueled or catalyst equipped diesel construction equipment, including all off-road and portable diesel-powered equipment.
- Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes as a maximum.
- Limit, to the extent feasible, the hours of operation of heavy-duty equipment and/or the amount of equipment in use.

- When commercially available, replace fossil fueled equipment with electrically driven equivalents (provided they are not run via a portable generator set).
- **AQ-2 Construction Equipment.** Construction equipment shall be equipped with an engine designation of EPA Tier 2 or better (Tier 2+). A list of the construction equipment, including all off-road equipment utilized at each of the projects by make, model, year, horsepower and expected/actual hours of use, and the associated EPA Tier shall be submitted to the County Planning and Development Services Department and ICAPCD prior to the issuance of a grading permit. The equipment list shall be submitted periodically to ICAPCD to perform a NO_x analysis. ICAPCD shall utilize this list to calculate air emissions to verify that equipment use does not exceed significance thresholds. The Planning and Development Services Department and ICAPCD shall verify implementation of this measure.
- AQ-3 Speed Limit. During construction and operation of the proposed project, the applicant shall limit the speed of all vehicles operating onsite on dirt roads to 15 miles per hour or less.
- AQ-4 Dust Suppression. The project applicant shall employ a method of dust suppression (such as water or chemical stabilization) approved by ICAPCD. The project applicant shall apply chemical stabilization as directed by the product manufacturer to control dust between the panels as approved by ICAPCD, and other non-used areas (exceptions will be the paved entrance and parking area, and Fire Department access/emergency entry/exit points as approved by Fire/Office of Emergency Services [OES] Department).
- AQ-5 Dust Suppression Management Plan. Prior to any earthmoving activity, the applicant shall submit a construction dust control plan and obtain ICAPCD and Imperial County Planning and Development Services Department (ICPDS) approval.
- **AQ-6 Operational Dust Control Plan.** Prior to issuance of a Certificate of Occupancy, the applicant shall submit an operations dust control plan and obtain ICAPCD and ICPDS approval.

ICAPCD Rule 301 Operational Fees apply to any project applying for a building permit. At the time that building permits are submitted for the proposed project, ICAPCD shall review the project to determine if Rule 310 fees are applicable to the project.

Mitigation Measure(s)

No mitigation measures are required.

Significance After Mitigation

Although the proposed project would not exceed ICAPCD's significance thresholds, APM AQ-1 through AQ-6 would provide additional reduction strategies to further improve air quality and reductions in criteria pollutants (O₃ precursors) and ensure that this potential impact would remain less than significant. Given the above, the proposed project would not conflict with implementation of applicable air quality plans, and impacts would be less than significant impact.

Impact 3.4-2 Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an

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applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for O_3 precursors)?

As shown in Table 3.4-2, the criteria pollutants for which the project area is in State non-attainment under applicable air quality standards are O₃ and PM₁₀. The ICAPCD's application of thresholds of significance for criteria air pollutants is relevant to the determination of whether a project's individual emissions would have a cumulatively significant impact on air quality. As discussed above in Impact 3.4-1, the emissions of criteria pollutants from project construction and operation activities are below the ICAPCD thresholds of significance. Furthermore, the proposed project will be required to implement all of the ICAPCD Regulation VIII, fugitive dust control measures during construction and operation of the proposed project. Furthermore, any stationary sources of emissions operated on site will be required to adhere to ICAPCD Rule 207, New and Modified Stationary Source Review and Rule 201 that require permits to construct and operate stationary sources. Therefore, the project's potential to result in a cumulatively considerable net increase of any criteria pollutant is considered less than significant.

Mitigation Measure(s)

No mitigation measures are required.

Impact 3.4-3 Would the project expose sensitive receptors to substantial pollutant concentrations?

The nearest sensitive receptors to the project site include the following:

- Single-family homes approximately 40 feet to the north side of the project site, located near the northwest corner of the project site.
- Single-family residence on the east side of N Best Avenue, located near the northeast corner of the project site
- Single-family residence on the east side of N Best Avenue, located across the proposed project's primary access road
- Two single-family residences located at the northeast corner of the intersection of N Best Avenue and Ward Road
- Single-family residence (with a horse boarding/training facility) on the west side of N Best Avenue, located south of the project site)

The ICAPCD CEQA Guidelines detail that any development project that is located within close proximity to sensitive receptors and where the proposed project either 1) Has the potential to emit toxic or hazardous pollutant; or 2) Exceeds the ICAPCD criteria pollutant thresholds for construction and operation of the proposed project. In addition, any proposed industrial or commercial project located within 1,000 feet of a school must be referred to the ICAPCD for review.

As discussed above in Impact 3.4-1, the proposed project would not exceed the ICAPCD criteria pollutant threshold from either construction or operation of the proposed project. However, construction and operation of the proposed project would have the potential to emit TAC emissions, which have been analyzed separately below.

Toxic Air Contaminants Impacts from Construction. The greatest potential for toxic air contaminant emissions would be related to diesel particulate matter (DPM) emissions associated with heavy equipment operations during construction of the proposed project. According to CARB methodology,

health effects from carcinogenic air toxics are usually described in terms of "individual cancer risk." "Individual Cancer Risk" is the likelihood that a person exposed to concentrations of toxic air contaminants over a 70-year lifetime will contract cancer, based on the use of standard risk-assessment methodology. It should be noted that the most current cancer risk assessment methodology recommends analyzing a 30-year exposure period for the nearby sensitive receptors.

Given the relatively limited number of heavy-duty construction equipment, the varying distances that construction equipment would operate to the nearby sensitive receptors, and the short-term construction schedule, the proposed project would not result in a long-term (i.e., 30 or 70 years) substantial source of toxic air contaminant emissions and corresponding individual cancer risk. In addition, California Code of Regulations Title 13, Article 4.8, Chapter 9, Section 2449 regulates emissions from off-road diesel equipment in California. This regulation limits idling of equipment to no more than five minutes, requires equipment operators to label each piece of equipment and provide annual reports to CARB of their fleet's usage and emissions. This regulation also requires systematic upgrading of the emission Tier level of each fleet, and currently no commercial operator is allowed to purchase Tier 0 or Tier 1 equipment and by January 2023 no commercial operator is allowed to purchase Tier 2 equipment. In addition to the purchase restrictions, equipment operators need to meet fleet average emissions targets that become more stringent each year between years 2014 and 2023. By January 2022, 50 percent or more of all contractors' equipment fleets must be Tier 2 or higher. Therefore, no significant short-term toxic air contaminant impacts would occur during construction of the proposed project. As such, construction of the proposed project would result in a less than significant exposure of sensitive receptors to substantial pollutant concentrations.

Operations-Related Sensitive Receptor Impacts. The proposed project would consist of the development of a solar facility with a BESS and a substation. Although the proposed solar PV panels, the lithium batteries utilized in the BESS, and the transformers utilized in the substation are made with toxic materials, only a negligible amount of TAC emissions are emitted from off-gassing from the PV panels, which would not create TAC concentrations high enough to create a significant cancer risk from TAC emissions. In addition, the proposed project would include a backup diesel generator, which would emit DPM emissions, which is categorized as a TAC. The backup diesel generator would be located in the southwest portion of the project site, where the nearest offsite sensitive receptor is a home on the east side of Best Avenue located approximately 1,900 feet to the east. Due to the distance that the nearest sensitive receptor, a less than significant TAC impact would occur from the backup diesel generator. Therefore, a less than significant TAC impact would occur during the ongoing operations of the proposed project.

In summary, construction and operation of the proposed project would result in a less than significant exposure of sensitive receptors to substantial pollutant concentrations.

Mitigation Measure(s)

No mitigation measures are required.

Impact 3.4-4 Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

An odor impact depends on numerous factors, including the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of the receptors. While offensive odors rarely cause any physical harm, they still can be very unpleasant, leading to considerable distress among the public and often generating citizen complaints to local governments and regulatory agencies.

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Among possible physical harms is inhalation of VOCs that cause smell sensations in humans. These odors can affect human health in four primary ways:

- The VOCs can produce toxicological effects
- The odorant compounds can cause irritations in the eye, nose, and throat
- The VOCs can stimulate sensory nerves that can cause potentially harmful health effects
- The exposure to perceived unpleasant odors can stimulate negative cognitive and emotional responses based on previous experiences with such odors

Land uses commonly considered to be potential sources of odorous emissions include wastewater treatment plants, sanitary landfills, food processing facilities, chemical manufacturing plants, rendering plants, paint/coating operations, and concentrated agricultural feeding operations and dairies. The construction and operation of a solar farm is not an odor producer.

Potential sources that may emit odors during construction activities include the application of coatings such as asphalt pavement, paints and solvents and from emissions from diesel equipment. The project would comply with standard construction requirements which include limitations of when construction may occur. Furthermore, the proposed project would be required to adhere to ICAPCD Rule 407 which limits the discharge of any emissions that create odors in quantities that may cause a nuisance or annoyance to any considerable number of persons. As such, the objectionable odors that may be produced during the construction process would be temporary and would not likely be noticeable for extended periods of time beyond the project site's boundaries. Through compliance with the applicable regulations that reduce odors and due to the transitory nature of construction odors, a less than significant odor impact would occur and no mitigation would be required.

The proposed project would consist of the development of a solar energy facility, which does not include any components that are a known sources of odors. Therefore, a less than significant odor impact would occur and no mitigation would be required.

Mitigation Measure(s)

No mitigation measures are required.

3.4.4 Decommissioning/Restoration and Residual Impacts

Decommissioning/Restoration

If at the end of the PPA term, no contract extension is available for a power purchaser, no other buyer of the energy emerges, or there is no further funding of the project, the project will be decommissioned and dismantled. Similar to construction activities, decommissioning and restoration of the project site would generate air emissions. A summary of the daily construction emissions for the project is provided in Table 3.4-8. Solar equipment has a lifespan of approximately 20 to 25 years. The emissions from on- and off-road equipment during decommissioning are expected to be significantly lower than project construction emissions, as the overall activity would be anticipated to be lower than project construction activity. No significant air quality impacts are anticipated during decommissioning and restoration of the project site. However, all construction projects within Imperial County must comply with the requirements of ICAPCD Regulation VIII for the control of fugitive dust. Furthermore, any stationary sources of emissions operated on site will be required to adhere to ICAPCD Rule 207, New and Modified Stationary Source Review and Rule 201 that require permits to construct and operate

stationary sources. Therefore, a less than significant impact is identified during decommissioning and site restoration of the project site.

Residual

The proposed project would not result in short-term significant air quality impacts during construction. Operation of the project, subject to the approval of a CUP, would be consistent with applicable federal, state, regional, and local plans and policies. The project would not result in any residual operational significant and unavoidable impacts with regards to air quality.

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3.5 Biological Resources

This section identifies the biological and aquatic jurisdictional resources that may be impacted by the proposed Brawley Solar Energy Project. The following identifies the existing biological and jurisdictional resources in the project area, analyzes potential impacts of the proposed project, and recommends mitigation measures to avoid or reduce potential impacts of the proposed project. The information for this section is summarized from the *Biological Technical Report for the Brawley Solar Project* prepared by Chambers Group Inc. (Appendix D of this EIR)

As part of the *Biological Resources Technical Report*, Chambers Group Inc. conducted a literature review, desktop survey, and biological reconnaissance survey of the project site to document the existing biological resources, to assess the habitat for its potential to support sensitive plant and wildlife species, and to determine the potential impacts of the projects on biological resources.

For the purposes of this EIR, the term project survey area refers to the project site's boundaries, the area immediately along the proposed gen-tie line along Andre Road, and a portion of the existing North Brawley Geothermal Power Plant substation where the gen-tie line would interconnect.

3.5.1 Existing Conditions

Vegetation Communities and Land Cover Types

Nine vegetation communities were observed within the project survey area. The acreage of each vegetation community and land cover type within the project survey area is summarized in Table 3.5-1 and depicted in Figure 3.5-1. The majority of vegetation communities and land cover types mapped within the project survey area consisted of agriculture and bare ground.

Table 3.5-1. Vegetation Communities or Land Cover Types within the Project Survey Area

Vegetation Community or Land Cover Type	Acres within Project Survey Area
Quail Bush Scrub*	4.86
Agricultural	91.96
Bare Ground	148.07
Developed	4.40
Disturbed	6.38
Bush Seepweed Scrub*	3.52
Arrow Weed Thickets*	6.23
Ornamental	1.87
Tamarisk Thickets	5.16
Project Survey Area Total	272.45

Source: Appendix D of this EIR

^a Vegetation and land cover type acreages are rounded to the nearest hundredth acre.

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Name: 21267 BIO Fig 4 Vegetation Communities Mxd Print Date: 12/29/2020, Author: poarlos

W Berghman Rd Survey Area
Vegetation Communities Brawley Solar Agricultural Disturbed **Vegetation Communities** Arrow Weed Thicket Ornamental Quail Bush Scrub 1,000 2,000 Bush Seepweed Scrub Tamarisk Thickets

Figure 3.5-1. Vegetation Communities and Land Cover Types in the Project Survey Area

Source: Appendix D of this EIR

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Detailed descriptions of the applicable vegetation communities and land cover types occurring within the project survey area are described below.

QUAIL BUSH SCRUB

Quail bush scrub is dominated by quail bush with scattered bush seepweed (*Sueda nigra*) present in areas where the habitat gently slopes into more alkaline soils. The shrub layer is thick and continuous with a nonexistent herbaceous layer. Stands occur in areas where less alkaline or saline soils are present, favoring clay soils and more consistent topography where water does not accumulate easily. Plant species observed within the project site included bush seepweed, big saltbush, and spiny chlorocantha (*Chloracantha spinosa*).

AGRICULTURAL

Large swaths of the project site consist of plots of agricultural fields that are no longer in use. Bermuda grass (*Cynodon dactylon*) is found in these areas with alfalfa (*Medicago sativa*) seedlings in lower numbers. Agricultural fields are similar to Bare Ground habitat where areas have higher water permeability and higher fossorial rodent habitat potential.

Mexican palo verde are planted along the outside of several agriculture fields to serve as wind breaks for agricultural purposes and are considered agricultural habitat. Trees are mature, averaging 15 meters in height and are continuously planted alongside the agricultural fields. Isolated honey mesquite (*Prosopis glandulosa*) shrubs were also observed along the northwestern portion of the poroject site along the tree line. Other plant species observed within the project site included alfalfa (*Medicago sativa*), Mexican palo verde, big saltbush, and tamarisk.

BARE GROUND

Bare Ground areas are generally devoid of vegetation but do not contain any form of pavement. Bare Ground has higher water permeability and higher fossorial rodent habitat potential. Bare Ground is present throughout the entire project site, with small patches between agricultural land and long swaths that include dirt access roads that receive very little use. Isolated alfalfa was the only vegetation observed in these areas.

DEVELOPED

Developed areas are areas that have been altered by humans and now display man-made structures such as urban areas, houses, paved roads, buildings, parks, and other maintained areas.

DISTURBED

Disturbed areas generally have altered topography and soils due to man-made reasons, usually pertaining to development or agricultural purposes. Any shrubs in the shrub canopy are isolated, and the herbaceous layer is sparse to intermittent with pockets of advantageous non-native species that spread from a singular location. Species observed included Bermuda grass (*Cynodon dactylon*), Mediterranean schismus (*Schismus barbatus*), and lamb's quarters (*Chenopodium album*).

BUSH SEEPWEED SCRUB

Bush seepweed is dominant in the shrub canopy with scattered quail bush present. The shrub layer is intermittent to continuous with an herbaceous layer that is very sparse. Stands occur in gently sloping plains bordering agricultural fields or irrigation ditches and areas with disturbed hydrology due to man-

made alteration. Soils are deep and saline or alkaline. Species observed within the project site included bush seepweed and big saltbush.

ARROYO WEED THICKETS

The shrub canopy is intermittent to continuous with shrubs reaching 2 to 3 meters in height. Vegetation is dominated by arrow weed and extends along the water feature, occasionally extending over the bank and into the access road. The herbaceous layer is open and intermittent, existing in between stands of cattail and arrow weed. The habitat exists in irrigation ditches consisting of soils that are sandy and loamy where water is permeable. Plant species observed included arrow weed, tamarisk, cattail, big saltbush, saltgrass (*Distichlis spicata*), and salt heliotrope (*Heliotropium curassavicum*).

ORNAMENTAL

Ornamental Landscaping includes areas where the vegetation is dominated by non-native horticultural plants. Typically, the species composition consists of introduced trees, shrubs, flowers, and turf grass.

TAMARISK THICKETS

Tamarisk dominates the tree canopy and is thick and continuous. This non-native shrub layer is sparse with isolated quail bush present, while the herbaceous layer contains very little vegetation. Trees average 15 meters in height and exist in irrigation ditches or on the upper banks along water features. Species observed within the project site included tamarisk and big saltbush.

Sensitive Natural Communities

Quailbush scrub, bush seepweed scrub, and arrow weed thickets occur within the project survey area and are considered sensitive natural communities by CDFW (CDFW 2021).

Special-Status Species

Literature Review

Prior to conducting field surveys, a literature search was conducted to identify special-status plant and animal species with potential to occur within the project survey area. Special-status plants and animal species were evaluated for their potential to occur within the project survey area where impacts could potentially occur.

Using information from the literature review and observations in the field, a list of special-status plant and animal species that have potential to occur within the project survey area was generated. For the purposes of this assessment, special-status species are defined as plants or animals that:

- have been designated as either rare, threatened, or endangered by CDFW, CNPS, or the USFWS, and/or are protected under either the federal or California ESAs;
- are candidate species being considered or proposed for listing under these same acts;
- are fully protected by the California FGC Sections 3511, 4700, 5050, or 5515; and
- are of expressed concern to resource and regulatory agencies or local jurisdictions.

Biological Reconnaissance Survey

Chambers Group biologists conducted the general reconnaissance survey within the project site to identify the potential for occurrence of sensitive species, vegetation communities, or habitats that could

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support sensitive wildlife species, including those identified in the literature review. The survey was conducted on foot throughout the project site between on October 22, 2020 to identify the potential for occurrence of sensitive species, vegetation communities, or habitats that could support sensitive wildlife species. Plant and wildlife species, including any special-status species that were observed during the survey, were recorded (see Appendix D of this EIR).

Potential for Occurrence Determinations

Special-status species reported for the region in the literature review or for which suitable habitat occurs on the BSAs were assessed for their potential to occur based on the following guidelines listed in Table 3.5-2.

Table 3.5-2. Criteria for Evaluating Sensitive Species Potential for Occurrence

Potential for Occurrence	Criteria		
Absent:	Species is restricted to habitats or environmental conditions that do not occur within the project site. Additionally, if the survey was conducted within the blooming period of the species and appropriate habitat was observed in the surrounding area but the species was not observed within the Project impact area, it was considered absent.		
Low:	Historical records for this species do not exist within the immediate vicinity (approximately 5 miles) of the project site, and/or habitats or environmental conditions needed to support the species are of poor quality.		
Moderate:	Either a historical record exists of the species within the immediate vicinity of the project site (approximately 3 miles) and marginal habitat exists on the project site, or the habitat requirements or environmental conditions associated with the species occur within the project site, but no historical records exist within 5 miles of the Project site.		
High:	Both a historical record exists of the species within the project site or its immediate vicinity (approximately 1 mile), and the habitat requirements and environmental conditions associated with the species occur within the project site.		
Present:	Species was detected within the project site at the time of the survey.		

Source: Appendix D of this EIR

Plant Species

Numerous special-status plant species have been recorded within project site, according to the CNDDB and CNPSEI. Special-status plant species identified in the literature review, and their potential to occur within the project site are discussed below.

Available records resulted in a list of five federally and/or state listed threatened and endangered or rare sensitive plant species that may potentially occur within the project site. After the literature review and the reconnaissance-level survey, it was determined that one species had a low potential to occur; and four of these species are considered Absent from the project site due to lack of suitable habitat.

The following four plant species are considered **absent** from the project site due to lack of suitable habitat:

- gravel milk-vetch (Astragalus sabulonum)
- Munz's cholla (Cylindropuntia munzii)
- glandular ditaxis (Ditaxis claryana)
- Thurber's pilostyles (*Pilostyles thurberi*)

The following species that is considered to have a **low potential** to be observed in the project site due to lack of suitable habitat includes:

• Abram's spurge (Euphorbia abramsiana). Abram's spurge is an annual herb in the spurge family that mostly exists in Sonoran or Mojave Desert habitats, favoring sandy flats where water is permeable. Although the habitats available at the project site are not typically where this plant would grow, it has the low potential to occur in fields, irrigation ditches, and other disturbed areas that all exist within the project site. In addition, this species was positively identified less than 2 miles from the project site. This identification, however, was made before 1940 and the population is presumed to be extirpated due to agricultural and residential development.

Wildlife Species

A database search resulted in a list of 23 federally and/or state listed endangered or threatened, Species of Concern, or otherwise sensitive wildlife species that may potentially occur within the project site. After a literature review and the assessment of the various habitat types within the project site, it was determined that 17 sensitive wildlife species were considered absent from the project site, three species have a low potential to occur, two species have a high potential to occur, and one species was present within the project site. Factors used to determine potential for occurrence included the quality of habitat and the location of prior CNDDB records of occurrence.

The following 17 wildlife species are considered **absent** from the project site due to lack of suitable habitat present on the project site:

- American badger (*Taxidea taxus*)
- black skimmer (Rynchops niger)
- California black rail (*Laterallus jamaicensis coturniculus*)
- Colorado Desert fringe-toed lizard (Uma notata)
- crissal thrasher (Toxostoma crissale)
- desert pupfish (Cyprinodon macularius)
- Gila woodpecker (*Melanerpes uropygialis*)
- gull-billed tern (Gelochelidon nilotica)
- Le Conte's thrasher (Toxostoma lecontei)
- lowland leopard frog (Lithobates yavapaiensis)
- Palm Springs pocket mouse (*Perognathus longimembris bangsi*)
- razorback sucker (Xyrauchen texanus)
- Sonoran Desert toad (Incilius alvarius)
- western snowy plover (Charadrius alexandrinus nivosus)
- yellow warbler (Setophaga petechia)
- Yuma hispid cotton rat (Sigmodon hispidus eremicus)
- Yuma Ridgway's rail (Rallus obsoletus yumanensis)

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The analysis of the CNDDB search and field survey resulted in three species with a **low** potential to occur on the project site due to low quality habitat:

- flat-tailed horned lizard (*Phrynosoma mcallii*)
- short-eared owl (Asio flammeus)
- western yellow bat (*Lasiurus xanthinus*)

The analysis of the CNDDB search and field survey resulted in two species with a **high** potential to occur on the project site. These species are described below:

- Burrowing owl. The burrowing owl (BUOW) is a California Species of Special Concern. The burrowing owl breeds in open plains from western Canada and the western United States, Mexico through Central America, and into South America to Argentina. This species inhabits dry, open, native or non-native grasslands, deserts, and other arid environments with low-growing and low-density vegetation. It may occupy golf courses, cemeteries, road rights-of way, airstrips, abandoned buildings, irrigation ditches, and vacant lots with holes or cracks suitable for use as burrows. Burrowing owls typically use burrows made by mammals such as California ground squirrels (*Otospermophilus beecheyi*), foxes, or badgers. When burrows are scarce, the burrowing owl may use man-made structures such as openings beneath cement or asphalt pavement, pipes, culverts, and nest boxes. High quality habitat exists within the project site. In addition, burrowing owl have recently been recorded within 0.14 mile of the project site. Therefore, this species has a high potential to occur within the project site.
- Mountain plover. The mountain plover (wintering) is a California Species of Special Concern and a federally Proposed Threatened Species. This species breeds from the prairie and sagebrush country of north-central Montana, eastern Wyoming, and the area around southeastern Colorado. It winters from central California along the southern border southward to northern Mexico. Common wintering habitats consist of dry, barren ground, smooth dirt fields, agricultural fields, and shortgrass prairies. This species tends to form small flocks in the winter. It is one of the few shorebird species that prefers habitats away from water. The project site contains suitable habitat of moderate to high quality. In addition, mountain plover have been recorded to occur within 1 mile of the project site. Therefore, this species has a high potential to occur with the project site.

One species was **present** within and directly adjacent to the project site during the survey. In addition, this species has been recorded to nest within and surrounding the project site. This species is described below:

• Loggerhead shrike. The loggerhead shrike (nesting) is a California Species of Special Concern. Habitats may include oak savannas, open chaparral, desert washes, juniper woodlands, Joshua tree woodlands, and other semi-open areas. It can occupy a variety of semi-open habitats with scattered trees, large shrubs, utility poles, and other structures that serve as lookout posts while searching for potential prey. Loggerhead shrikes prefer dense, thorny shrubs and trees, brush piles, and tumbleweeds for nesting. During the survey, one individual was observed just outside the northwest boundary of the project site, and an additional individual was observed within the southwest portion of the project site. In addition, suitable nesting and foraging habitat is present within and directly adjacent to the project site.

Aquatic Resources

A general assessment of jurisdictional waters regulated by the Porter-Cologne Water Quality Act, California Fish and Game Code Sections 1600 and 1602, United States Army Corps of Engineers (USACE), and California Regional Water Quality Control Board (RWQCB) was conducted for the project site. The assessment was conducted by a desktop survey through the USGS National Hydrography Dataset for hydrological connectivity.

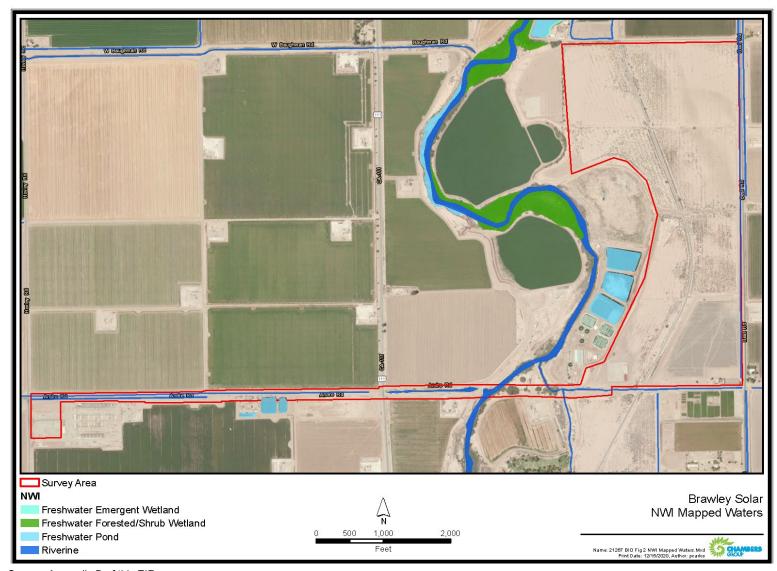
The western portion of the project site is located within the New River watershed (Hydrologic Unit Code [HUC-10] 1810020411) and within the Federal Emergency Management Agency (FEMA) 100-year flood zone. The New River watershed at the project site is bordered to the south by Imperial Valley, to the west by the Vallecito Mountains, to the north by the Salton Sea, and to the east by the Chocolate Mountains. The New River is the major water source for the watershed, which drains into the Salton Sea. Along its watercourse, several tributaries, including mostly agricultural drains and canals discharge into the New River.

The eastern portion of the project site is located within the Alamo River watershed (HUC-10 1810020408) and is within the FEMA 100-year flood zone. The Alamo River is the major water source for the watershed, which also drains into the Salton Sea. The primary tributaries to the Alamo River are agricultural drains and canals. Both rivers are known to be heavily polluted with agricultural and bacterial toxins.

Several jurisdictional and non-jurisdictional features were observed within the project survey area. The New River, a National Wetlands Inventory (NWI) mapped blueline, flows through the middle portion of the project survey area (Figure 3.5-2). In addition, several NWI mapped blueline canals, drains, and ditches owned by IID flow along the borders of the project survey area. The locations of the features observed during the field survey are shown in Figure 3.5-3.

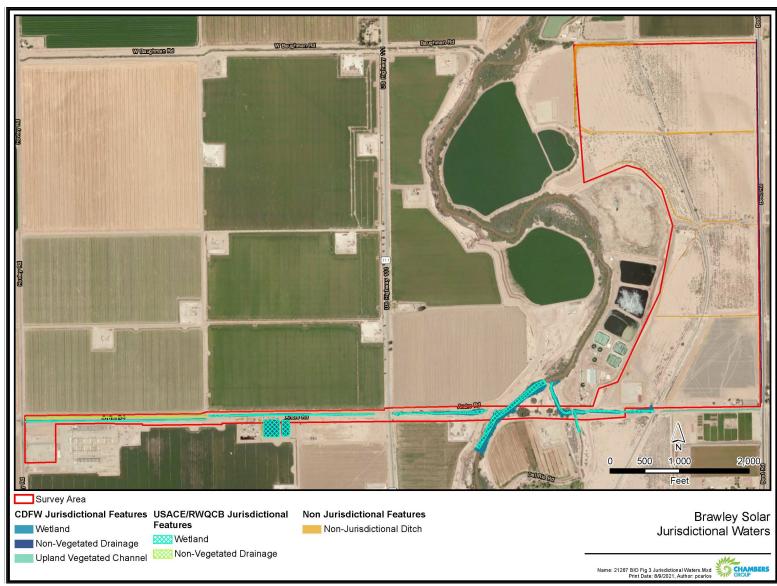
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Figure 3.5-2. NWI Mapped Waters in Project Survey Area



Source: Appendix D of this EIR

Figure 3.5-3. Jurisdictional Waters in the Project Survey Area



Source: Appendix D of this EIR

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WETLAND FEATURES

Feature 1 (IID "Spruce Three Drain"). This feature occurs along the proposed gen-tie line located in the southwest portion of the project site along Andre Road. The Spruce Three drain is a mapped NWI stream (Riverine Intermittent Stream Bed, Seasonally Flooded, Excavated). The drainage is manmade and receives flow from surface runoff from Andre Road and surrounding agricultural fields. Bankto-bank measurements ranged from 13 to 80 feet.

Ordinary High Water Mark (OHWM) measurements ranged from 6 to 40 feet. The drain flows into the project site from the west at Hovley Road along the south side of Andre Road, flows east for approximately 0.50 mile and crosses under Andre Road to the north side of the road, and appears to continue to flow eastward until it empties into the New River, which terminates at the Salton Sea. The feature is lined with riparian vegetation dominated by arrow weed (Pluchea sericea) a Facultative Wetland (FACW) species, meaning one that usually occurs in wetlands but is also found in non-wetlands.

Feature 2. This feature occurs along the gen-tie line portion of the project site, on the north side of Andre Road. Feature 2 is a man-made, unvegetated cement-lined ditch. Bank-to-bank measured 10 feet; the OHWM measured 4 feet. The feature flows into the project site from the west for approximately 0.50 mile, where it appears to connect to the Spruce Three Drain. Feature 2 receives flow from road runoff and agricultural runoff from the surrounding agricultural fields.

Feature 3 (New River). This feature flows through the eastern portion of the gen-tie line. The New River is an NWI mapped blueline wetland riverine system (Riverine Lower Perennial, Unconsolidated Bottom Wetland, Permanently Flooded). Bank-to bank-measurements ranged from 110 to 170 feet. OHWM measurements ranged from 42 to 107 feet. The river flows south to north from Mexico and terminates in the Salton Sea. Within the project site, the vegetation along the banks of the river consists completely of tamarisk (*Tamarix* spp.) a Facultative (FAC) species, one that is equally likely to occur in wetlands or non-wetlands.

Feature 4 (IID "Livesly Drain"). This feature occurs east of the New River in the eastern portion of the gen-tie line. The Livesly Drain is a NWI mapped blueline stream. This feature is man-made and receives flow from agricultural runoff. The Livesly Drain flows into the project site from the east, turns north, and exits into the New River. Bank-to-bank measurements ranged from 20 to 120 feet. The OHWM measurements ranged from 13 to 20 feet. The portion of the drainage within the project site is composed completely of tamarisk.

Feature 5 (IID "Oakley Canal"). This feature occurs just south of the Livesly Drain. The Oakley Canal is a NWI mapped blueline stream (Riverine Intermittent Stream Bed, Seasonally Flooded, Excavated). Feature 5 is man-made and receives flow from agricultural runoff. The Oakley Canal flows south to north and empties into the Livesly Canal. Bank-to-bank measurements ranged from 25 feet to 48 feet. OHWM measured 15 feet. The vegetation along the banks of Feature 5 consists primarily of tamarisk.

Feature 6 (IID "Best Canal"). This feature occurs along the eastern border of the project site on the west side of N Best Avenue. The canal is a NWI mapped blueline stream (Riverine Intermittent Stream Bed, Seasonally Flooded, Excavated) that receives flow from agricultural and road run-off. Bank-to-bank the canal measured 15 feet; OHWM measured 5 feet. The canal is unvegetated throughout the project site and flows south to north, exits the project site, turns west and eventually empties into the New River.

Feature 7. This feature occurs in the southeast portion of the project site on the south side of Andre Road along the gen-tie line. Feature 7 consists of two man-made detention ponds with riparian vegetation and are mapped NWI wetlands (Palustrine Unconsolidated Bottom Wetland, Permanently Flooded, Excavated). The vegetation within Feature 7 is dominated by tamarisk and cattail (*Typha* spp.), an Obligate (OBL) species, one that almost always occurs naturally in wetlands. In addition, arrow weed and big saltbush (*Atriplex lentiformis*), also known as quail bush, a FAC species, were observed.

MANMADE FEATURES

Several man-made unvegetated ditches were observed throughout the project site. When a field is irrigated, water is allowed to flow through smaller man-made earthen or concrete-lined ditches (typically referred to as a "head ditch"), which distributes the water evenly across the field. At the opposite, lower elevation side of the field, excess water is collected into another ditch (typically referred to as a "tail ditch").

The ditches present on the project site are both earthen and concrete-lined and are frequently rebuilt when the fields are plowed and disked. These ditches occur primarily along the edges of the agricultural fields and across portions of the fields. None of these ditches connect directly to a major feature, and most terminate at small, man-made detention areas. Therefore, these features are not considered jurisdictional under CDFW, RWQCB, or USACE.

The Imperial County Fire Department (ICFD) Fire Prevention Bureau requires two points of emergency access for the project along the west side of the railroad tracks. One access route may be extended from the main access road located off N Best Avenue utilizing an existing access road that crosses over a concrete lined channel and a second access route is proposed to be constructed in the northwest portion of the project site crossing over a non-jurisdictional irrigation ditch. Vegetation within this feature comprised of quail bush, and non-native Mexican palo verde (*Parkinsonia aculeata*) and tamarisk.

Wildlife Movement Corridors, Linkages, and Significant Ecological Areas

The concept of habitat corridors addresses the linkage between large blocks of habitat that allow the safe movement of mammals and other wildlife species from one habitat area to another. The definition of a corridor is varied, but corridors may include such areas as greenbelts, refuge systems, underpasses, and biogeographic land bridges, for example. In general, a corridor is described as a linear habitat, embedded in a dissimilar matrix, which connects two or more large blocks of habitat. Wildlife movement corridors are critical for the survivorship of ecological systems for several reasons. Corridors can connect water, food, and cover sources, spatially linking these three resources with wildlife in different areas. In addition, wildlife movement between habitat areas provides for the potential of genetic exchange between wildlife species populations, thereby maintaining genetic variability and adaptability to maximize the success of wildlife responses to changing environmental conditions. This is especially critical for small populations subject to loss of variability from genetic drift and effects of inbreeding. Naturally, the nature of corridor use and wildlife movement patterns varies greatly among species.

Habitat Conservation Plans

The project site is located within the designated boundaries of the Desert Renewable Energy Natural Community Conservation Plan & Habitat Conservation Plan (NCCP/HCP). However, the project is not located within or adjacent to an Area of Critical Environmental Concern.

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3.5.2 Regulatory Setting

This section identifies and summarizes federal, state, and local laws, policies, and regulations that are applicable to the proposed projects.

Federal

Bald and Golden Eagle Protection Act of 1940

The Bald Eagle Protection Act of 1940 protects bald eagle (*Haliaeetus leucocephalus*) and golden eagle (*Aquila chrysaetos*) by prohibiting the taking, possession, and commerce of such birds and establishes civil penalties for violation of this Act. 'Take' is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." 'Disturb' is defined as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available: (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior" (72 *Federal Register* [FR] 31132; 50 CFR 22.3). All activities that may disturb or incidentally take an eagle or its nest as a result of an otherwise legal activity must be permitted by the USFWS under this Act.

Federal Endangered Species Act

The Federal Endangered Species Act (ESA) protects federally listed threatened and endangered species and their habitats from unlawful take and ensures that federal actions do not jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. Under the ESA, "take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The U.S. Fish and Wildlife Service (USFWS) regulations define harm to mean "an act which actually kills or injures wildlife" (50 CFR 17.3).

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) prohibits the kill or transport of native migratory birds, or any part, nest, or egg of any such bird unless allowed by another regulation adopted in accordance with the MBTA. The prohibition applies to birds included in the respective international conventions between the U.S. and Great Britain, the U.S. and Mexico, the U.S. and Japan, and the U.S. and Russia. Disturbances that cause nest abandonment and/or loss of reproductive effort or the loss of habitats upon which these birds depend may be a violation of the MBTA. As authorized by the MBTA, the USFWS issues permits to qualified applicants for the following types of activities: falconry, raptor propagation, scientific collecting, special purposes (rehabilitation, education, migratory game bird propagation, and salvage), take of depredating birds, taxidermy, and waterfowl sale and disposal. The regulations governing migratory bird permits can be found in 50 CFR Part 13 General Permit Procedures and 50 CFR Part 21 Migratory Bird Permits. The State of California has incorporated the protection of birds of prey in Sections 3800, 3513, and 3503.5 of the California Fish and Game Code.

Section 404 Permit (Clean Water Act)

The purpose of the Clean Water Act (CWA) is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." Section 404 of the CWA prohibits the discharge of dredge and fill material into waters of the U.S., including wetlands, without a permit from the U.S. Army Corps of Engineers (USACE). Activities regulated under this program include fills for development, water

resource projects (e.g., dams and levees), infrastructure development (e.g., highways and airports), and conversion of wetlands to uplands for farming and forestry. Either an individual 404b permit or authorization to use an existing USACE Nationwide Permit will need to be obtained if any portion of the construction requires fill into a river, stream, or stream bed that has been determined to be a jurisdictional waterway.

State

California Endangered Species Act

Provisions of CESA protect state-listed threatened and endangered species. The California Department of Fish and Wildlife (CDFW) regulates activities that may result in "take" of individuals ("take" means "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill"). Habitat degradation or modification is not expressly included in the definition of "take" under the California Fish and Game Code (FGC). Additionally, California FGC contains lists of vertebrate species designated as "fully protected" (California FGC Sections 3511 [birds], 4700 [mammals], 5050 [reptiles and amphibians], 5515 [fish]). Such species may not be taken or possessed.

In addition to state-listed species, CDFW has also produced a list of Species of Special Concern to serve as a "watch list." Species on this list are of limited distribution or the extent of their habitats has been reduced substantially such that threats to their populations may be imminent. Species of Special Concern may receive special attention during environmental review, but they do not have statutory protection.

Birds of prey are protected in California under California FGC. Section 3503.5 states it is "unlawful to take, possess, or destroy any birds of prey (in the order Falconiformes or Strigiformes) 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.

California Fish and Game Code Section1600 et. seq (as amended)

The California FGC Section 1600 et. seq. requires that a Notification of Lake or Streambed Alteration be submitted to CDFW for "any activity that may substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake." The CDFW reviews the proposed actions and, if necessary, submits to the Applicant a proposal for measures to protect affected fish and wildlife resources. The final proposal that is mutually agreed upon by CDFW and the Applicant is the Streambed Alteration Agreement (SAA). Often, projects that require an SAA also require a permit from the USACE under Section 404 of the CWA. In these instances, the conditions of the Section 404 permit and the SAA may overlap.

California Fish and Game Code Sections 3503, 3503.5, and 3513

Under Sections 3503, 3503.5, and 3513 of the California FGC, activities that would result in the taking, possessing, or destroying of any birds-of-prey, taking or possessing of any migratory nongame bird as designated by the MBTA, or the taking, possessing, or needlessly destroying of the nest or eggs of any raptors or non-game birds protected by the MBTA, or the taking of any non-game bird pursuant to FGC Section 3800 are prohibited. Additionally, the state further protects certain species of fish, mammals, amphibians and reptiles, birds, and mammals through CDFW's Fully Protected Animals which prohibits any take or possession of classified species.

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California Fish and Game Code Sections 1900-1913 (Native Plant Protection Act)

California's Native Plant Protection Act prohibits the taking, possessing, or sale within the state of any plant listed by CDFW as rare, threatened, or endangered. This allows CDFW to salvage listed plant species that would otherwise be destroyed.

Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act, all projects proposing to discharge waste that could affect waters of the State must file a waste discharge report with the appropriate regional board. The project falls under the jurisdiction of the Colorado River RWQCB.

California Environmental Quality Act

Title 14 CCR, Section 15380 requires the identification of endangered, rare, or threatened species or subspecies of animals or plants that may be impacted by a project. If any such species are found, appropriate measures should be identified to avoid, minimize, or mitigate the potential effects of projects.

Local

Imperial County General Plan

The Conservation and Open Space Element of the Imperial County General Plan provides detailed plans and measures for the preservation and management of biological and cultural resources, soils, minerals, energy, regional aesthetics, air quality, and open space. The purpose of this element is to recognize that natural resources must be maintained for their ecological value for the direct benefit to the public and to protect open space for the preservation of natural resources, the managed production of resources, outdoor recreation, and for public health and safety. In addition, the purpose of this element is to promote the protection, maintenance, and use of the County's natural resources with particular emphasis on scarce resources, and to prevent wasteful exploitation, destruction, and neglect of the state's natural resources. Table 3.5-3 analyzes the consistency of the project with specific policies contained in the Imperial County General Plan associated with biological resources.

Table 3.5-3. Project Consistency with General Plan Goals and Policies

General Plan Policies	Consistency with General Plan	Analysis
Conservation and Open Space Element - Open Space and Recreation Conservation Policy No. 2 - The County shall participate in conducting detailed investigations into the significance, location, extent, and condition of natural resources in the County. Program: Notify any agency responsible for protecting plant and wildlife before approving a project which would impact a rare, sensitive, or unique plant or wildlife habitat.	Consistent	A biological assessment has been conducted at the project site to evaluate the proposed project's potential impacts on biological resources. Implementation of the proposed project has the potential to impact special-status wildlife species, including burrowing owl, mountain plover, and loggerhead shrike. Applicable agencies responsible for protecting plants and wildlife will be notified of the proposed projects and provided an opportunity to comment on this EIR prior to the County's consideration of
		any approvals for the project. As described in Chapter 2, Project Description, implementation of the project would require the approval of a CUP, General Plan Amendment, and Zone Change by the County to allow for the construction and operation of the project.
Conservation of Environmental Resources for Future Generations Goal 1 - Environmental resources shall be conserved for future generations by minimizing environmental impacts in all land use decisions and educating the public on their value. Objective 1.6 - Promote the conservation of ecological sites and preservation of cultural resource sites through scientific investigation and public education.	Consistent	A biological assessment has been conducted at the project site to evaluate the project's potential impacts on biological resources. Implementation of the proposed project has the potential to impact special-status wildlife species, including burrowing owl, mountain plover, and loggerhead shrike. However, with implementation of mitigation (Mitigation Measures BIO-1 through BIO-4), the project would not result in residual significant or unmitigable impacts on biological resources.

Source: County of Imperial 1993

3.5.3 Impacts and Mitigation Measures

This section presents the significance criteria used for considering the respective project's impacts on biological resources, the methodology employed for the evaluation, an impact evaluation, and mitigation requirements, if necessary.

Thresholds of Significance

Based on CEQA Guidelines Appendix G, project impacts related to biological resources are considered significant if any of the following occur:

- 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 CDFW or USFWS
- 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 CDFW or USFWS

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- Have a substantial adverse effect on state or federally-protected wetlands (including but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filing, hydrological interruption, or other means
- Interfere substantially with the movement of any native resident or migratory fish and 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
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan

Methodology

This analysis evaluates the potential for the project, as described in Chapter 2, Project Description, to interact with local biological resources on the project site. Based on the extent of these interactions, this analysis considers whether these conditions would result in an exceedance of one or more of the applied significance criteria as identified above.

A biological resources technical report was prepared for the project. The information obtained from the sources was reviewed and summarized to present the existing conditions and to identify potential environmental impacts, based on the significance criteria presented in this section. Impacts associated with biological resources that could result from project construction and operational activities were evaluated qualitatively based on-site conditions; expected construction practices; and materials, locations, and duration of project construction and related activities.

Impact Analysis

Impact 3.5-1 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 CDFW or USFWS?

Construction

SPECIAL-STATUS PLANTS

One plant species, Abram's spurge, has a low potential to occur on the project site. However, the project site has low quality habitat for this species and this plant species has not been recorded within 3 miles of the project site in the last 25 years. Therefore, no impacts to these species are anticipated to occur due to project related construction activities.

SPECIAL-STATUS WILDLIFE

Three species have a low potential to occur (flat-tailed horned lizard, short-eared owl, and western yellow bat), two species have a high potential to occur (BUOW and mountain plover), and one species (loggerhead shrike) was present within the project site. During the site reconnaissance, two loggerhead shrikes were observed within the project site.

Flat-tailed horned lizard, short-eared owl, and western yellow bat have a low potential to occur on the project site. However, low quality habitat for these species occurs within the project site and none of these species have been recorded within the project site within the last 25 years. Therefore, no impacts to these species are anticipated to occur as a result of project activities.

Burrowing owl and mountain plover are considered to have a high potential to occur within the project site. Two loggerhead shrikes were observed within the project site. Direct impacts to these species that could occur include injury, mortality, nest failures, and loss of young. Indirect impacts include loss of nesting and foraging habitat, increase in anthropogenic effects (i.e., noise levels, introduction of invasive and nonnative species, increase in human activity, increase in dust). Implementation of Mitigation Measures BIO-1, BIO-2, BIO-3, and BIO-4 would reduce potential impacts to a level less than significant. Mitigation Measure BIO-1 requires implementation of general impact avoidance and minimization measures during construction such as designating a Project Biologist to oversee compliance with protective measures for biological resources, delineating construction zones, and working and traveling only in designated work areas and access roads. Mitigation Measure BIO-2 requires that all construction personnel to complete a Worker Environmental Awareness Program prior to the start of construction. Mitigation Measure BIO-3 requires pre-construction surveys for burrowing owl. If burrowing owl is identified during the breeding season (February 1 through August 31), then an appropriate buffer will be established by the biological monitor in accordance with the Staff Report on Burrowing Owl Mitigation (CDFG 2012). Construction within the buffer will be avoided until a qualified biologist determines that burrowing owl is no longer present or until young have fledged. Mitigation Measure BIO-4 required a pre-construction nesting bird survey to be conducted by a qualified avian biologist to ensure that active bird nests, including those for the loggerhead shrike and mountain plover will not be disturbed or destroyed.

Operation

All electrical components on the project site shall be either undergrounded or protected so that there will be no exposure to wildlife and therefore no potential for electrocution. Additionally, based on the Avian Powerline Interaction Committee's (APLIC) 1996 report on power line electrocution in the U.S., avian electrocution risk is highest along distribution lines (generally less than 69 kV) where the distance between energized phases, ground wires, transformers, and other components of an electrical distribution system are less than the length or skin-to-skin contact distance of birds. The distance between energized components along transmission lines (>69 kV) is generally insufficient to present avian electrocution risk. Therefore, no impact to avian is anticipated to occur due to electrocution along the proposed gen-tie line.

Mitigation Measure(s)

- **BIO-1 General Impact Avoidance and Minimization Measures.** The following measures will be applicable throughout the life of the project:
 - To reduce the potential indirect impact on migratory birds, bats and raptors, the project will comply with the APLIC 2012 Guidelines for overhead utilities, as appropriate, to minimize avian collisions with transmission facilities (APLIC 2012)
 - All electrical components on the project site shall be either undergrounded or protected so that there will be no exposure to wildlife and therefore no potential for electrocution.

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- The project proponent shall designate a Project Biologist who shall be responsible for overseeing compliance with protective measures for the biological resources during vegetation clearing and work activities within and adjacent to areas of native habitat. The Project Biologist will be familiar with the local habitats, plants, and wildlife. The Project Biologist will also maintain communications with the Contractor to ensure that issues relating to biological resources are appropriately and lawfully managed and monitor construction. The Project Biologist will monitor activities within construction areas during critical times, such as vegetation removal, the implementation of Best Management Practices (BMP), and installation of security fencing to protect native species. The Project Biologist will ensure that all wildlife and regulatory agency permit requirements, conservation measures, and general avoidance and minimization measures are properly implemented and followed.
- The boundaries of all areas to be newly disturbed (including solar facility areas, staging areas, access roads, and sites for temporary placement of construction materials and spoils) will be delineated with stakes and flagging prior to disturbance. All disturbances, vehicles, and equipment will be confined to the flagged areas.
- No potential wildlife entrapments (e.g., trenches, bores) will be left uncovered overnight. Any uncovered pitfalls will be excavated to 3:1 slopes at the ends to provide wildlife escape ramps. Alternatively, man-made ramps may be installed. Covered pitfalls will be covered completely to prevent access by small mammals or reptiles.
- To avoid wildlife entrapment (including birds), all pipes or other construction materials or supplies will be covered or capped in storage or laydown area, and at the end of each work day in construction, quarrying and processing/handling areas. No pipes or tubing of sizes or inside diameters ranging from 1 to 10 inches will be left open either temporarily or permanently.
- No anticoagulant rodenticides, such as Warfarin and related compounds (indandiones and hydroxycoumarins), may be used within the project site, on off-site project facilities and activities, or in support of any other project activities.
- Avoid wildlife attractants. All trash and food-related waste shall be placed in self-closing containers and removed regularly from the site to prevent overflow. Workers shall not feed wildlife. Water applied to dirt roads and construction areas for dust abatement shall use the minimal amount needed to meet safety and air quality standards to prevent the formation of puddles, which could attract wildlife. Pooled rainwater or floodwater within retention basins will be removed to avoid attracting wildlife to the active work areas.
- To minimize the likelihood for vehicle strikes on wildlife, speed limits will not exceed 15 miles per hour when driving on access roads. All vehicles required for O&M must remain on designated access/maintenance roads.
- Avoid night-time construction lighting or if nighttime construction cannot be avoided use shielded directional lighting pointed downward and towards the interior of the

project site, thereby avoiding illumination of adjacent natural areas and the night sky.

- All construction equipment used for the project will be equipped with properly operating and maintained mufflers.
- Hazardous materials and equipment stored overnight, including small amounts of fuel to refuel hand-held equipment, will be stored within secondary containment when within 50 feet of open water to the fullest extent practicable. Secondary containment will consist of a ring of sand bags around each piece of stored equipment/structure. A plastic tarp/visqueen lining with no seams shall be placed under the equipment and over the edges of the sandbags, or a plastic hazardous materials secondary containment unit shall be utilized by the Contractor.
- The Contractor will be required to conduct vehicle refueling in upland areas where fuel cannot enter waters of the U.S. and in areas that do not have potential to support federally threatened or endangered species. Any fuel containers, repair materials, including creosote-treated wood, and/or stockpiled material that is left on site overnight, will be secured in secondary containment within the work area and staging/assembly area and covered with plastic at the end of each work day.
- In the event that no activity is to occur in the work area for the weekend and/or a
 period of time greater than 48 hours, the Contractor will ensure that all portable
 fuel containers are removed from the project site.
- All equipment will be maintained in accordance with manufacturer's recommendations and requirements.
- Equipment and containers will be inspected daily for leaks. Should a leak occur, contaminated soils and surfaces will be cleaned up and disposed of following the guidelines identified in the Stormwater Pollution Prevention Plan or equivalent, Materials Safety Data Sheets, and any specifications required by other permits issued for the project.
- The Contractor will utilize off-site maintenance and repair shops as much as possible for maintenance and repair of equipment.
- If maintenance of equipment must occur onsite, fuel/oil pans, absorbent pads, or appropriate containment will be used to capture spills/leaks within all areas. Where feasible, maintenance of equipment will occur in upland areas where fuel cannot enter waters of the U.S. and in areas that do not have potential to support federally threatened or endangered species.
- Appropriate BMPs will be used by the Contractor to control erosion and sedimentation and to capture debris and contaminants from bridge construction to prevent their deposition in waterways. No sediment or debris will be allowed to enter the creek or other drainages. All debris from construction of the bridge will be contained so that it does not fall into channel. Appropriate BMPs will be used by the Contractor during construction to limit the spread of resuspended sediment and to contain debris.

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- Erosion and sediment control devices used for the proposed project, including fiber rolls and bonded fiber matrix, will be made from biodegradable materials such as jute, with no plastic mesh, to avoid creating a wildlife entanglement hazard.
- Firearms, open fires, and pets would be prohibited at all work locations and access roads. Smoking would be prohibited along the project alignment.
- Cross-country vehicle and equipment use outside of approved designated work areas and access roads shall be prohibited to prevent unnecessary ground and vegetation disturbance.
- Any injured or dead wildlife encountered during project-related activities shall be reported to the project biologist, biological monitor, CDFW, or a CDFW-approved veterinary facility as soon as possible to report the observation and determine the best course of action. For special-status species, the Project Biologist shall notify the County, USFWS, and/or CDFW, as appropriate, within 24 hours of the discovery.
- Stockpiling of material will be allowed only within established work areas.
- Actively manage the spread of noxious weeds
- The ground beneath all parked equipment and vehicles shall be inspected for wildlife before moving.
- Worker Environmental Awareness Program. Prior to project construction, a Worker Environmental Awareness Program shall be developed and implemented by a qualified biologist and shall be available in both English and Spanish. Handouts summarizing potential impacts to special-status biological resources and the potential penalties for impacts to these resources shall be provided to all construction personnel. At a minimum, the education program shall including the following:
 - the purpose for resource protection;
 - a description of special-status species including representative photographs and general ecology;
 - occurrences of USACE, RWQCB, and CDFW regulated features in the project survey area;
 - regulatory framework for biological resource protection and consequences if violated
 - sensitivity of the species to human activities;
 - avoidance and minimization measures designed to reduce the impacts to special-status biological resources
 - environmentally responsible construction practices;
 - reporting requirements;
 - the protocol to resolve conflicts that may arise at any time during the construction process; and

- workers sign acknowledgement form indicating that the Environmental Awareness
 Training and Education Program that has been completed and would be kept on
 record.
- BIO-3 Burrowing Owl Avoidance and Minimization. Take avoidance (pre-construction) surveys for burrowing owl shall be completed prior to project construction. Surveys shall be conducted as detailed within Appendix D of the Staff Report on Burrowing Owl Mitigation (California Department of Fish and Game [CDFG] 2012). If burrowing owl is not detected, construction may proceed.
 - If burrowing owl is identified during the non-breeding season (September 1 through January 31), then a 50-meter buffer will be established by the biological monitor. Construction within the buffer will be avoided until a qualified biologist determines that burrowing owl is no longer present or until a CDFW-approved exclusion plan has been implemented. The buffer distance may be reduced if noise attenuation buffers such as hay bales are placed between the occupied burrow and construction activities.
 - If burrowing owl is identified during the breeding season (February 1 through August 31), then an appropriate buffer will be established by the biological monitor in accordance with the Staff Report on Burrowing Owl Mitigation (CDFG 2012). Construction within the buffer will be avoided until a qualified biologist determines that burrowing owl is no longer present or until young have fledged. The buffer distance may be reduced in consultation with CDFW if noise attenuation buffers such as hay bales are placed between the occupied burrow and construction activities.
- **Pre-Construction Nesting Bird Survey.** If construction or other project activities are scheduled to occur during the bird breeding season (typically February 1 through August 31 for raptors and March 15 through August 31 for the majority of migratory bird species), a pre-construction nesting-bird survey shall be conducted by a qualified avian biologist to ensure that active bird nests, including those for the loggerhead shrike and mountain plover will not be disturbed or destroyed.

The survey shall be completed no more than three days prior to initial ground disturbance. The nesting-bird survey shall include the project site and adjacent areas where project activities have the potential to affect active nests, either directly or indirectly due to construction activity or noise. If an active nest is identified, the biologist shall establish an appropriately sized disturbance-limit buffer around the nest using flagging or staking. Construction activities shall not occur within any disturbance-limit buffer zones until the nest is deemed inactive by the qualified biologist. If construction activities cease for a period of greater than three days during the bird breeding season, a pre-construction nesting bird survey shall be conducted prior to the commencement of activities.

Final construction buffers or setback distances shall be determined by the qualified biologist in coordination with USFWS and CDFW on a case-by-case basis, depending on the species, season in which disturbance shall occur, the type of disturbance, and other factors that could influence susceptibility to disturbance (e.g., topography, vegetation, existing disturbance levels, etc.).

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Significance After Mitigation

The proposed project has the potential to impact special-status wildlife species during construction. However, implementation of Mitigation Measures BIO-1 through BIO-4 would reduce potential impacts to a level less than significant.

Impact 3.5-2 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 CDFW or USFWS?

Quailbush scrub, bush seepweed scrub, and arrow weed thickets occur within the project survey area and are considered sensitive natural communities by CDFW (CDFW 2021). The proposed project has been designed to avoid these sensitive natural communities. Access routes would be constructed in an area that will avoid or minimize impacts to native vegetation found within the irrigation ditch, and flagging and/or staking would be used to clearly define the work area boundaries to avoid impacts to adjacent native communities. Therefore, the proposed project would have no impact on sensitive natural communities.

Mitigation Measure(s)

No mitigation is required.

Impact 3.5-3 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, filing, hydrological interruption, or other means?

As shown in Figure 3.5-2 and Figure 3.5-3, several jurisdictional features were observed within the project site. The New River, a NWI mapped blueline, flows through the middle portion of the project site. In addition, several NWI mapped blueline canals, drains, and ditches owned by IID flow along the borders of the project site. However, the proposed project has been designed to avoid impacts to waters of the State and waters of the U.S. As shown on the Site Plan (Figure 2-3), project components would not be sited on the project site where aquatic resources are present.

The emergency access route from the northwest portion of the project site will be designed to cross a non-jurisdictional agricultural ditch. Potential access route options include converting a non-vegetated portion of an open cement culvert to a corrugated metal pipe (CMP) or a closed concrete pipe of similar size and establishing an access road above the pipe. Native quail bush and non-native tamarisk and Mexican palo verde are located within the irrigation ditch. However, the access routes would be constructed in an area that will avoid impacts to native vegetation found within the irrigation ditch. Therefore, implementation of the project would result in no impact on state or federally protected aquatic resources.

Mitigation Measure(s)

No mitigation is required.

Impact 3.5-4 Would the project interfere substantially with the movement of any native resident or migratory fish and wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

The project site does not function as a wildlife corridor. The project site is located adjacent to areas containing existing disturbances (i.e., roads, railroad tracks, and active agricultural land). The majority of the project site does not contain suitable vegetation or cover to support wildlife movement and are nestled between agricultural and development; therefore, wildlife movement opportunities connecting the project site to large, undeveloped natural areas is limited. The proposed project is not expected to significantly impact wildlife movement through the project vicinity and a less than significant impact would occur.

Mitigation Measure(s)

No mitigation is required.

Impact 3.5-5 Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

The proposed project consists of the construction and operation of a solar energy facility, BESS, and associated electrical transmission lines. Development of the solar facility would be subject to the County's zoning ordinance.

The project is located on 5 privately owned legal parcels zoned General Agricultural with Geothermal Overlay (A-2-G). Pursuant to Title 9, Division 5, Chapter 8 (County of Imperial 2019a), the following uses are permitted in the A-2 zone subject to approval of a CUP from Imperial County: solar energy electrical generator, battery storage facility, electrical substations, communication towers, and facilities for the transmission of electrical energy.

As demonstrated in Table 3.5-3 and discussed further in Section 3.11 Land Use Planning, with approval of a CUP, General Plan Amendment, and Zone Change, the project would be consistent with Imperial County General Plan, and with biological resources policies contained therein. Therefore, implementation of the proposed project would not result in a significant impact associated the project's potential to conflict with local policies protecting biological resources.

Mitigation Measure(s)

No mitigation is required.

Impact 3.5-6 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?

The project site is located within the designated boundaries of the Desert Renewable Energy Natural Community Conservation Plan & Habitat Conservation Plan (NCCP/HCP). However, the project is not located within or adjacent to an Area of Critical Environmental Concern. Implementation of the proposed project would result in no impact associated with the potential to conflict with local conservation plans. No impact would occur.

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Mitigation Measure(s)

No mitigation is required.

3.5.4 Decommissioning/Restoration and Residual Impacts

Decommissioning/Restoration

If at the end of the PPA term, no contract extension is available for a power purchaser, no other buyer of the energy emerges, or there is no further funding of the project, the project will be decommissioned and dismantled. Project decommissioning activities will require construction vehicles to drive across the solar facility, transmission line, and access roads. Concrete footings, foundations, and pads would be removed using heavy equipment and recycled at an off-site location. All remaining components would be removed, and all disturbed areas would be reclaimed and recontoured. Similar to project construction, decommissioning activities have the potential to directly impact special-status species. his is a potentially significant impact; however, implementation of Mitigation Measures BIO-1 through BIO-4 at the time of decommissioning would reduce impacts to a level less than significant.

Residual

The proposed project would not impact sensitive vegetation communities, state or federally-protected wetlands, would not conflict with any local policies or ordinances protecting biological resources and would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

With the implementation of Mitigation Measures BIO-1 through BIO-4, potential impacts to special-status species, including BOUW, mountain plover, and loggerhead shrike would be reduced to a level less than significant. Therefore, the project would not result in residual significant and unmitigable impacts related to biological resources.

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3.6 Cultural Resources

This section discusses cultural resources that may be potentially impacted by the proposed project. The following identifies the existing cultural resources within the project site, analyzes potential impacts of the proposed project, and recommends mitigation measures to avoid or reduce potential impacts of the proposed project.

Information for this section is summarized from the *Archaeological and Paleontological Assessment Report for the Brawley Solar Project* prepared by Chambers Group, Inc. This report is included in Appendix E of this EIR. The cultural resources inventory included a records search, literature review, and pedestrian survey.

3.6.1 Existing Conditions

Cultural Setting

Prehistory

The project site is located in the mid-section of the lower Colorado Desert, in which ancient Lake Cahuilla was situated – the present-day Salton Sea is illustrative of lower stands of the former Ancient Lake Cahuilla. In addition to paleontological potential, archaeological deposits found around the shoreline of Lake Cahuilla radiocarbon date to at least 1,440 years before present (B.P.) and shows demonstrable evidence of cultural activity in the area. Lake Cahuilla presented a massive freshwater oasis, allowing seasonal occupations resulting in archaeological deposits that include pottery, ground and chipped stone artifacts, and archaeological features such as rock fish traps. As an ethnographic landscape, the Cahuilla, Kumeyaay, Kamia, and the tribes which now comprise the Colorado River Indian Tribes (CRIT), the Mojave, Chemehuevi, Hopi, and Navajo settled in various locations around the basin, including the Colorado delta. Cultural resources located in the area tend to be associated with Lake Cahuilla due to its temporal context and functional use as a landscape, which yield archaeological data of high significance regarding how people adapted to the changing environment around the lake.

The three general time periods accepted in the region are the San Dieguito Complex, the Archaic period, and the Late Prehistoric period. These periods are briefly described below.

The earliest recognized occupation of the region, dating to 10,000 to 8,000 years B.P., is known as the San Dieguito complex. Assemblages from this occupation generally consist of flaked stone tools. Evidence of milling activities is rare for sites dating to this period. It is generally agreed that the San Dieguito complex shows characteristics of the Western Pluvial Lakes Tradition (WPLT), which was widespread in California during the early Holocene. The WPLT assemblage generally includes scrapers, choppers, and bifacial knives. Archaeologists theorize this toolkit composition likely reflects a generalized hunting and gathering society.

The following period, the Archaic (8,500 to 1,300 B.P.), is traditionally seen as encompassing both coastal and inland adaptations, with the coastal Archaic represented by the shell middens of the La Jolla complex and the inland Archaic represented by the Pauma complex. Coastal settlement is also thought to have been significantly affected by the stabilization of sea levels around 4,000 years ago that led to a general decline in the productivity of coastal ecosystems. Artifacts associated with this period include milling stones, unshaped manos, flaked cobble tools, Pinto-like and Elko projectile points, and flexed inhumations. Colorado Desert rock art studies have led researchers to suggest

Archaic-Period origins for many petroglyph and pictograph styles and elements common in later times. More recently, several important late Archaic-period sites have been documented in the northern Coachella Valley, consisting of deeply buried middens with clay-lined features and living surfaces, cremations, hearths, and rock shelters. Faunal assemblages show a high percentage of lagomorphs (rabbits and hares). The larger sites suggest a more sustained settlement type than previously known for the Archaic period in this area.

The Late Prehistoric period (1,300 to 200 B.P.) is marked by the appearance of small projectile points indicating the use of the bow and arrow, the common use of ceramics, and the general replacement of inhumations with cremations, all characteristic of the San Luis Rey complex. The San Luis Rey complex is divided temporally into San Luis Rey I and San Luis Rey II, with the latter distinguished mainly by the addition of ceramics. Along the coast of northern San Diego County, deposits containing significant amounts of Donax shell are now often assigned to the Late Prehistoric, based on a well-documented increase in the use of this resource at this time.

Ethnohistory

The project site was occupied by the Cahuilla, Quechan, Kumeyaay, Kamia, and the CRIT. The two closest tribal reservations to the project site are the Torres-Martinez Reservation located to northwest of the project site and Fort Yuma reservation located to the southeast of the project site. The Torres-Martinez Indian Reservation is currently home to the desert Cahuilla Indians and is on the northwest side of the Salton Sea, roughly 55 miles from the project site. Fort Yuma is located approximately 51 miles closer to the California-Arizona border and is the home of the Quechan. An ethnographic and archaeological summary of the Cahuilla, Quechan, Kumeyaay, Kamia, and CRIT is provided in Section 3.14, Tribal Cultural Resources of this EIR.

Regional History

The first significant European settlement of California began during the Spanish Period (1769 to 1821) when 21 missions and four presidios were established between San Diego and Sonoma. Although located primarily along the coast, the missions dominated economic and political life over the greater California region. The purpose of the missions was primarily for political control and forced assimilation of the Native American population into Spanish society and Catholicism, along with economic support to the presidios.

In the 1700s, due to pressures from other colonizers (Russians, French, British), New Spain decided that a party should be sent north with the idea of founding both military presidios and religious missions in Alta California to secure Spain's hold on its lands. The aim of the party was twofold. The first was the establishment of presidios, which would give Spain a military presence within its lands. The second was the establishment of a chain of missions along the coast slightly inland, with the aim of Christianizing the native population. By converting the native Californians, they could be counted as Spanish subjects, thereby bolstering the colonial population within a relatively short time.

The party was led by Gaspar de Portolá and consisted of two groups: one would take an overland route, and one would go by sea. All parties were to converge on San Diego, which would be the starting point for the chain of Spanish colonies. What became known as the Portolá Expedition set out on March 24, 1769. Portolá, who was very loyal to the crown and understood the gravity of his charge, arrived in what would become San Diego on July 1, 1769. Here, he immediately founded the presidio of San Diego. Leaving one group in the southern part of Alta California, Portolá took a smaller group and began heading north to his ultimate destination of Monterey Bay. Continuing up the coast, Portolá

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established Monterey Bay as a Spanish possession on June 3, 1770, although it would take two expeditions to accomplish this task.

Having established the presidios at San Diego and Monterey, Portolá returned to Mexico. During the first four years of Spanish presence in Alta California, Father Junípero Serra, a member of the Portolá expedition and the Catholic leader of the new province, began establishing what would become a chain of 21 coastal missions in California. The first, founded concurrently at San Diego with the presidio, was the launching point for this group. During this time, four additional missions (San Carlos Borromeo de Carmelo, San Antonio de Padua, San Gabriel Arcángel, and San Luis Obispo de Tolosa) were established.

The Mexican Period (1821-1848) began with the success of the Mexican Revolution in 1821, but changes to the mission system were slow to follow. When secularization of the missions occurred in the 1830s, the missions' vast land holdings in California were divided into large land grants called ranchos. The Mexican government granted ranchos throughout California to Spanish and Hispanic soldiers and settlers. Even after the decree of secularization was issued in 1833 by the Mexican Congress, missionaries continued to operate a small diocesan church. In 1834, the San Gabriel Mission, including over 16,000 head of cattle, was turned over to the civil administrator.

In 1848, the Treaty of Guadalupe Hidalgo ended the Mexican American War and marked the beginning of the American Period (1848 to present). The discovery of gold that same year sparked the 1849 California Gold Rush, bringing thousands of miners and other new immigrants to California from various parts of the United States, most of whom settled in the northern part of the state. For those settlers who chose to come to southern California, much of their economic prosperity was fueled by cattle ranching rather than by gold. This prosperity, however, came to a halt in the 1860s because of severe floods and droughts, as well as legal disputes over land boundaries, which put many ranchos into bankruptcy.

Imperial County was formed in 1907 from a portion of San Diego County known as Imperial Valley and is the newest of California's counties. It is known for being one of California's most prosperous agricultural communities because of its vast canal systems stemming from the Colorado River. The first diversion of the Colorado River was in 1905 and continued through 1942 when the All-American Canal was completed. It is this water, conveyed from the Colorado River, that makes Imperial County so rich.

City of Brawley

Just as the Imperial Valley was starting to develop, a circular was released by the U.S. Government in 1902 claiming nothing would grow in this desert area, even with plentiful water. This now famous "libel" changed the name of Brawley, which was initially slated to be called Braly. A man named J.H. Braly from Los Angeles had underwritten shares of water stock and was assigned 4,000 acres of land at the center of the site where Brawley now stands. When Braly read this circular, he appealed to the Imperial Land Company to be released from his bargain. They told him they expected to build a city on his land and call it Braly. However, J.H. Braly wanted no part of it; he did not want his name connected with what he envisioned as a failure. George E. Carter, who was building the grade for the new railroad, heard of Braly's wish and took over Braly's contract for the 4,000 acres.

The Imperial Land Company got wind of the deal and sent emissaries to Carter, who sold out. Meanwhile, A.H. Heber (a principal in the townsite organizing company) had a friend in Chicago by the name of Brawley and suggested the town be called that name. The company ordered the new town platted in October of 1902. Brawley had a petition signed and was ready to incorporate in June

1907 but deferred the matter until the new Imperial County was formed out of a portion of San Diego County that year. Then in February 1908, a petition was filed, and Brawley was allowed to call an election. The vote was 34 to 22 in favor of incorporation.

For more than a century, Brawley has remained close to its roots of being a small, agricultural community. Many of its businesses cater to area farmers and ranchers who also call Brawley home. From the beginning, those who believed in Brawley were successful in creating imaginative ways to develop an oasis in what was once a hostile environment. Now as then, the town folk of Brawley pull together to create a united vision that is attractive to visitors, homeowners, consumers, developers and businesspeople alike. Incorporated in 1908, was a "tent city" of only 100 persons who were involved in railroads and the earliest introduction of agriculture. It had a population of 11,922 in 1950, but population growth was slow from the 1960s to the early 1990s.

Records Search

A records search dated October 14, 2020, was obtained from the South Coastal Information Center (SCIC) at San Diego State University. The records search provided information on all documented cultural resources and previous archaeological investigations within the 1-mile record search radius. Resources consulted during the records search conducted by the SCIC included the NRHP, California Historical Landmarks, California Points of Historical Interest, and the CRHR Inventory. Results of the records search and additional research are detailed below.

Previous Research

Based upon the records search conducted by the SCIC, 14 cultural resource studies have previously been completed within the 1-mile records search radius. Of the 14 previous studies, 9 of the studies were within the project site. A list of previous cultural resource studies within the 1-mile records search radius is provided in the *Archaeological and Paleontological Assessment Report for the Brawley Solar Project* (Appendix E of this EIR).

Previously Recorded Resources

Based upon the records search conducted by the SCIC, 5 previously recorded cultural resources were recorded within the 1-mile record search radius. Results show that none of the previously recorded resources are mapped within the project site boundaries. A list of previously recorded resources within the 1-mile records search radius is provided in the *Archaeological and Paleontological Assessment Report for the Brawley Solar Project* (Appendix E of this EIR).

Field Survey

A pedestrian survey was conducted on the project site between November 2 and 5, 2020. The purpose of the field survey was to visually inspect the ground surface for both paleontological and archaeologically significant materials. The archaeologists assessed the ground surface for prehistoric artifacts (e.g., flaked stone tools, tool-making debris, stone milling tools), historic-period artifacts (e.g., metal, glass, ceramics), and sediment discoloration that might indicate the presence of a cultural midden, as well as depressions and other features indicative of the former presence of structures or buildings (e.g., post holes, foundations). When an artifact or feature was observed during survey, the GPS data were recorded using the ArcGIS Collector application; photographs and measurements were taken; and, when applicable, for historic glass artifacts, the maker's marks and date codes were recorded for further analysis and post-processing.

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During completion of the survey, resource CA-IMP-08166H was relocated. Although not mapped within the actual project site boundaries, a segment of CA-IMP-08166H was relocated due to its bisecting position between the two adjacent project areas. Additionally, six newly recorded historic-period resources were identified (Table 3.6-1). The new historic-period resources were fully documented with the appropriate DPR 523 series forms for each of the new resources and will be submitted to the SCIC for inclusion in the archaeological database.

Table 3.6-1. Newly Identified Cultural Resources within the Project Site

Resource Name (Temporary)	Trinomial Number	Date Recorded	Age	Description	Recommended Evaluation
21267-001	Pending	November 2, 2020	Historic	Single-story residence	Recommended not eligible
21267-002	Pending	November 2, 2020	Historic	House/pads; glass and ceramic scatter	Not evaluated
21267-003 (Iso)	Pending	November 3, 2020	Historic	Green glass bottle base	Not evaluated
21267-004	Pending	November 5, 2020	Multi-component	Glass bottle, sanitary and food can scatter	Not evaluated
21267-005	Pending	November 5, 2020	Multi-component	Historic glass bottle, sanitary and food can scatter, modern refuse	Not evaluated
21267-006	Pending	November 5, 2020	Historic	Canals/water conveyance, part of irrigation district	Not evaluated

Source: Appendix E of this EIR

Historical Resources

Historical resources significant under CEQA include those designated or eligible for designation in the NRHP, the CRHR or other state program, or a local register of historical resources. Historical resources may also include resources listed in the State Historic Resources Inventory as significant at the local level or higher, and resources evaluated as potentially significant in a survey or other professional evaluation.

As shown in Table 3.6-1, a total of 6 cultural resources were identified within the project site: four historic-period and two multi-component sites. Five of the resources have yet to be evaluated. A detailed description of these five resources is provided in the *Archaeological and Paleontological Assessment Report for the Brawley Solar Project* (Appendix E of this EIR).

Resource 21267-001 was evaluated and not recommended eligible for designation in the NRHP, the CRHR or other state program, or a local register of historical resources. The NRHP and CRHR eligibility criteria are described below.

- NRHP Eligibility Criteria. Four criteria have been established to determine if a resource is significant to American history, architecture, archaeology, engineering, or culture and should be listed in the NRHP. These criteria include:
 - A. It is associated with events that have made a significant contribution to the broad patterns of our history;
 - B. It is associated with the lives of persons significant in our past;
 - C. It embodies the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; and
 - D. It yields, or may be likely to yield, information important in prehistory or history.
- CRHR Eligibility Criteria. For the purposes of CEQA review, a historical resource is defined as follows (14 CCR 15064.5[a]):
 - 1. A resource listed in, or determined eligible by the State Historical Resources Commission for listing in, the California Register of Historical Resources (CRHR)
 - 2. A resource included in a local register of historical resources
 - 3. A resource identified as significant in a historical resource survey meeting the requirements specified in PRC 5024.1(g)
 - 4. Any resource that the lead agency determines to be historically significant

Site 21267-001

Site 21267-001 is a historic farm/ranch complex, including a single-story house, numerous miscellaneous outbuildings, and a fenced area on the east side of the property. The farm/ranch is located at 5003 N Best Avenue, Brawley, CA 92227, at the northwest corner of N Best Avenue and Ward Road, which runs parallel to the east-west Livesley Drain. The complex is in the southeastern most location within the project site boundaries and is bordered to the north and northwest by agricultural fields. The complex is visible as early as 1945 on the USGS map and 1953 in aerial imagery. The house and associated structures are still present. The building appears to correspond to typical minimal traditional style of form and construction, resting on a perimeter foundation of poorly consolidated concrete made with local materials. Wood joists are noted in the interior where exposed, suggesting a post-and-pier foundation for the floor of the building. The outline is a simple rectangle with a low, gabled roofline and minimal pitch. Roof eaves minimally extend, with boxed in soffits. The exterior is treated in stucco, using techniques typical of the period; tarpaper wrap, with wire mesh, a brown/scratch coat, and a finish coat. There are several wood-trimmed piercings for wood-cased double-sash windows. Cast-iron waste pipes are embedded into the exterior surface along one wall.

Several outbuildings are present, but their function remains unknown at this time. These are wood-framed and sided, and most are in a state of collapse or disrepair. Construction techniques and the greater fullness of the dimensions of the dimensional lumber suggest that these buildings are contemporaneous with the main residential building.

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ELIGIBILITY CONSIDERATION

Site 21267-001 was evaluated in March 2021 by Chambers Group. Based on the evaluation of the residence, either as a complex or as individual structures, none of the four criteria are met for inclusion in the CRHR and the resource is recommended not eligible.

Criterion 1: This resource does not meet the criteria under Criterion 1 as it is not associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States. Therefore, this resource is recommended not eligible for the CRHR under Criterion 1.

Criterion 2: This resource does not meet Criterion 2 as it is not associated with the lives of persons who are important to local, California history. While research has yielded information to suggest that one of the original land patent holders, Thomas A. Livesley, was fairly prominent in Salem, Oregon, neither he nor his family, or those also listed on the 1911 land patent, were specifically associated with Brawley or Imperial Valley, California history. There is no evidence that Mr. Livesley or his family ever resided at 5003 N Best Avenue and were not mentioned as being influential in literature regarding the Imperial Irrigation District between the 1900s and 1940s or the history of Imperial Valley between the 1900s and 1930s (Dowd 1956; Tout 1931). It is likely that Mr. Livesley and the other parties listed on the land patent were involved in speculative agriculture but were not personally invested in the overall development of Brawley or within Imperial Valley.

Additionally, there is no evidence that the subsequent property titles holders, namely the Flammangs, were of particular significance in Brawley. The Flammangs were owners of a few farms over the decades, but there is no documentation stating any noteworthy influence in Brawley, Imperial Valley, or California. Therefore, this resource is recommended not eligible for the CRHR Criterion 2.

Criterion 3: This resource does not meet Criterion 3 for embodying the distinctive characteristics of a type, period, or method of construction; or as a representative work of a master; or for possessing high artistic values. represent a very common property type throughout the United States, California, and San Diego. Many Traditional Style residences were constructed throughout the United States during the twentieth century and these examples are neither unique nor innovative for the period in which they were constructed. Therefore, this resource is recommended not eligible for the CRHR under Criterion 3.

Criterion 4: This resource does not meet Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the history of the United States, California, or San Diego during the twentieth century. Therefore, this resource is recommended not eligible for the CRHR under Criterion 4.

3.6.2 Regulatory Setting

This section identifies and summarizes federal, state, and local laws, policies, and regulations that are applicable to the project.

Federal

National Historic Preservation Act

Federal regulations (36 CFR Part 800.2) define historic properties as "any prehistoric or historic district, site, building, structure, or object included, or eligible for inclusion in, in the National Register of Historic Places." Section 106 of the National Historic Preservation Act (NHPA) (Public Law 89-665; 80 Stat

915; USC 470, as amended) requires a federal agency with jurisdiction over a project to take into account the effect of the project on properties included in or eligible for the (NRHP, and to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. The term "cultural resource" is used to denote a historic or prehistoric district, site, building, structure, or object, regardless of whether it is eligible for the NRHP.

State

California Office of Historic Preservation

The California Office of Historic Preservation (OHP) administers state and federal historic preservation programs and provides technical assistance to federal, state, and local government agencies, organizations, and the general public with regard to historic preservation programs designed to identify, evaluate, register, and protect California's historic resources.

Section 15064.5 of the CEQA Guidelines also requires that Native American concerns and the concerns of other interested persons and corporate entities, including but not limited to museums, historical commissions, associations, and societies be solicited as part of the process of cultural resources inventory. In addition, California law protects Native American burials, skeletal remains, and associated grave goods regardless of their antiquity and provides for the sensitive treatment and disposition of those remains (HSC Section 7050.5, PRC Sections 5097.94 et seg.).

CEQA Guidelines: Historical Resources Definition

CEQA Guidelines Section 15064.5(a) defines a historical resource as:

- (1) A resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the CRHR (PRC Section 5024.1; Title 14 CCR, Section 4850 et seq.).
- (2) A resource included in a local register of historical resources, as defined in Section 5020.1(k) of the Public Resources Code or identified as significant in an historical resource survey meeting the requirements Section 5024.1(g) of the Public Resources Code, shall be presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.
- (3) Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be an historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the CRHR (PRC Section 5024.1; Title 14 CCR, Section 4852) including the following:
 - (A) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
 - (B) Is associated with the lives of persons important to our past;

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- (C) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
- (D) Has yielded, or may be likely to yield, information important in prehistory or history.¹
- (4) The fact that a resource is not listed in, or determined to be eligible for listing in the CRHR, not included in a local register of historical resources (pursuant to Section 5020.1(k) of the Public Resources Code), or identified in an historical resources survey (meeting the criteria in Section 5024.1(g) of the Public Resources Code) does not preclude a lead agency from determining that the resource may be an historical resource as defined in Public Resources Code Sections 5020.1(j) or 5024.1.

CEQA Guidelines: Archaeological Resources

Section 15064.5(c) of CEQA Guidelines provides specific guidance on the treatment of archaeological resources as noted below.

- (1) When a project will impact an archaeological site, a lead agency shall first determine whether the site is an historical resource, as defined in subdivision (a).
- (2) If a lead agency determines that the archaeological site is an historical resource, it shall refer to the provisions of Section 21084.1 of the Public Resources Code, and this section, Section 15126.4 of the Guidelines, and the limits contained in Section 21083.2 of the Public Resources Code do not apply.
- (3) If an archaeological site does not meet the criteria defined in subdivision (a), but does meet the definition of a unique archeological resource in Section 21083.2 of the Public Resources Code, the site shall be treated in accordance with the provisions of Section 21083.2. The time and cost limitations described in Public Resources Code Section 21083.2 (c–f) do not apply to surveys and site evaluation activities intended to determine whether the project location contains unique archaeological resources.
- (4) If an archaeological resource is neither a unique archaeological nor an historical resource, the effects of the project on those resources shall not be considered a significant effect on the environment. It shall be sufficient that both the resource and the effect on it are noted in the Initial Study or EIR, if one is prepared to address impacts on other resources, but they need not be considered further in the CEQA process.

CEQA Guidelines: Human Remains

Section 15064.5 of CEQA Guidelines provides specific guidance on the treatment of human remains pursuant to PRC § 5097.98, which provides specific guidance on the disposition of Native American burials (human remains), and fall within the jurisdiction of the NAHC:

(d) When an initial study identifies the existence of, or the probable likelihood, of Native American human remains within the project, a lead agency shall work with the appropriate Native Americans as identified by the NAHC as provided in Public Resources Code Section 5097.98. The applicant may develop an agreement for treating or disposing of, with appropriate dignity, the human remains and any items associated with Native American burials with the

¹ Ibid.

appropriate Native Americans as identified by the NAHC. Action implementing such an agreement is exempt from:

- (1) The general prohibition on disinterring, disturbing, or removing human remains from any location other than a dedicated cemetery (HSC Section 7050.5).
- (2) The requirements of CEQA and the Coastal Act.
- (e) In the event of the accidental discovery or recognition of any human remains in any location other than a dedicated cemetery, the following steps should be taken:
 - (1) There shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until:
 - (A) The coroner or the county in which the remains are discovered must be contacted to determine that no investigation of the cause of death is required, and
 - (B) If the coroner determines the remains to be Native American:
 - 1. The coroner shall contact the NAHC within 24 hours.
 - 2. The NAHC shall identify the person or persons it believes to be the most likely descended from the deceased Native American.
 - The mostly descendent may make recommendations to the landowner of the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Public Resources Code section 5097.98, or
 - (2) Where the following conclusions occur the landowner or his authorized representative shall rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance.
 - (A) The NAHC is unable to identify a most likely descendent or the most likely descendent failed to make a recommendation within 24 hours after being notified by the commission.
 - (B) The descendant fails to make a recommendation; or
 - (C) The landowner or his authorized representative rejects the recommendation of the descendant, and the mediation by the NAHC fails to provide measures acceptable to the landowner.
- (f) As part of the objectives, criteria, and procedures required by Section 21082 of the Public Resources Code, a lead agency should make provisions for historical or unique archaeological resources accidentally discovered during construction. These provisions should include an immediate evaluation of the find by a qualified archaeologist. If the find is determined to be an historical or unique archaeological resource, contingency funding and a time allotment sufficient to allow for implementation of avoidance measures or appropriate mitigation should be available. Work could continue on other parts of the building site while historical or unique archaeological resource mitigation takes place."

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California Health and Safety Code, Section 7050.5

California HSC 7050.5 makes it a misdemeanor to disturb or remove human remains found outside a cemetery. This code also requires a project owner to halt construction if human remains are discovered and to contact the County Coroner.

Local

Imperial County General Plan

The Imperial County General Plan provides goals, objectives, and policies for the identification and protection of significant cultural resources. The Conservation and Open Space Element of the General Plan includes goals, objectives, and policies for the protection of cultural resources and scientific sites that emphasize identification, documentation, and protection of cultural resources. While Section 3.9, Land Use Planning, of this EIR analyzes the project's consistency with the General Plan pursuant to CEQA Guidelines Section 15125(d), the Imperial County Board of Supervisors and Planning Commission ultimately make a determination as to the project's consistency with the General Plan. Goals and Objectives applicable to the proposed project are summarized in Table 3.6-2.

Table 3.6-2. Project Consistency with Applicable General Plan Goals and Objectives

General Plan Policies	Consistency with General Plan	Analysis	
Conservation and Open Space Element - Open Space and Recreation Conservation	Consistent	A cultural resources inventory was prepared for the project area. Known archaeological resources within the project area will be avoided and not impacted. However, as discussed below, the proposed project has the potential to encounter undocumented historical, archaeological resources, and human remains. Implementation of Mitigation Measure CUL-1 and CUL-2 would require a supervising monitor to monitor all ground disturbing activity and to	
Goal 1 - Environmental resources shall be conserved for future generations by minimizing			
environmental impacts in all land use decisions and educating the public on their value.			
Objective 1.4 - Ensure the conservation and management of the County's natural and cultural resources.		provide WEAP training to workers to reduce potential impacts on historical resources to a level less than significant. Implementation of Mitigation Measures CUL-3, CUL-4, and CUL-5 would reduce the potential impact associated with the inadvertent discovery of archaeological	
Objective 3.1 - Protect and	Objective 3.1 - Protect and	resources to a level less than significant.	
preserve sites of archaeological, ecological, historical, and scientific value, and/or cultural significance.		At the completion of construction, an Archaeological Resources Monitoring Report will be prepared to summarize all monitoring efforts and observations, as performed, and all prehistoric or historic archaeological finds per Mitigation Measure CUL-6. Mitigation Measure CUL-7 would ensure that the potential impact on previously unknown human remains does not rise to the level of significance pursuant to CEQA.	

Source: County of Imperial 1993

Notes:

CUL=cultural; WEAP= Worker Environmental Awareness Program

3.6.3 Impacts and Mitigation Measures

This section presents the significance criteria used for considering proposed project impacts related to cultural and archeological resources, the methodology employed for the evaluation, an impact evaluation, and mitigation requirements, if necessary.

Thresholds of Significance

Based on CEQA Guidelines Appendix G, project impacts related to cultural resources are considered significant if any of the following occur:

- Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5
- Disturb any human remains, including those interred outside of dedicated cemeteries

Methodology

This analysis evaluates the potential for the proposed project, as described in Chapter 2, Project Description, to interact with cultural resources in the project area. Based on the extent of these interactions, this analysis considers whether these conditions would result in an exceedance of one or more of the applied significance criteria as identified above.

As indicated in the environmental setting, the *Archaeological and Paleontological Assessment Report* for the Brawley Solar Project (Appendix E of this EIR) was prepared for the project. The cultural resources inventory provides the results of a SCIC records search and a field survey which have been completed for the project area pursuant to CEQA.

The information from the cultural resources inventory was reviewed and summarized to present the existing conditions and to identify potential environmental impacts, based on the significance criteria presented in this section. Impacts associated with cultural resources that could result from project construction and operational activities were evaluated qualitatively based on site conditions; expected construction practices; materials, locations, and duration of project construction and related activities.

Impact Analysis

Impact 3.6-1 Would the project cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?

To be considered historically significant, a resource must meet one of four criteria for listing outlined in the CRHR (CEQA Guidelines 15064.3 (a)(3)). In addition to meeting one of the criteria outlined the CRHR, a resource must retain enough intact and undisturbed deposits to make a meaningful data contribution to regional research issues (CCR Title 14, Chapter 1.5 Section 4852 [c]). Further, based on CEQA Guidelines Section 15064.5 (b), substantial adverse change would include physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource is materially impaired. This can occur when a project:

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- Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the CRHR, NRHP, a local register, or historic resources.
- Demolishes or materially alters in an adverse manner those physical characteristics that
 account for its identification in an historical resources survey meeting the requirements of PRC
 §5024.1(g), unless the public agency establishes by a preponderance of the evidence that the
 resource is not historically or culturally significant.

As shown in Table 3.6-1, six newly recorded cultural resources were identified within the project site during field surveys. Newly identified cultural resources comprise both historic-period and two multicomponent sites. Resource 21267-001 is recommended not eligible for listing and the other five resources have not been formally evaluated for potential eligibility for listing in the CRHR. The project applicant will avoid ground-disturbing activities within and in close proximity to these resources. However, if-ground disturbing activities must occur within and in close proximity to these resources, a significant impact may potentially occur. Mitigation Measure CUL-1 and CUL-2 would involve retaining a Qualified Archaeologist to monitor ground disturbing work and provide WEAP training to construction personnel If ground disturbing activities encounter unanticipated discoveries that are potentially significant historical resources pursuant to CEQA. Mitigation Measures CUL-3, CUL-4, and CUL-5 would require construction to be halted in the area surrounding the discovery so that the Qualified Archaeologist can conduct formal site evaluations to assess whether resource(s) are potentially eligible for listing in the CRHR. At the completion of construction, an Archaeological Resources Monitoring Report will be prepared to summarize all monitoring efforts and observations, as performed, and all prehistoric or historic archaeological finds per Mitigation Measure CUL-6. Implementation of Mitigation Measures CUL-1 through CUL-6 would reduce potential impacts associated with cultural resources to a level less than significant.

Mitigation Measure(s)

CUL-1 Cultural Monitoring. Prior to construction, the project Applicant shall retain the services of a Qualified Professional Archaeologist meeting the Secretary of the Interior's Standards for a Qualified Archaeologist and require that all initial ground-disturbing work be monitored by someone trained in artifact and feature identification in monitoring contexts. A Supervising Archaeological Specialist and a Paleontological Monitor, to be retained by the project applicant, will be required to be present at the

project construction phase kickoff meeting.

- Worker Environmental Awareness Program. Prior to any ground disturbance, the supervising Archaeological Resources Specialist and Archaeological Resources Monitor shall conduct initial Worker Environmental Awareness Program (WEAP) training to all construction personnel, including supervisors, present at the outset of the project construction work phase, for which the Lead Contractor and all subcontractors shall make their personnel available. This WEAP training will educate construction personnel on how to work with the monitor(s) to identify and minimize impacts to paleontological resources and maintain environmental compliance and be performed periodically for new personnel coming on to the project as needed.
- CUL-3 Discovery of Previously Unidentified Archaeological Materials. In the event of the discovery of previously unidentified archaeological materials, the construction contractor shall immediately cease all work activities within approximately 100 feet of the discovery. After cessation of excavation, the construction contractor shall immediately contact the Imperial County Department of Planning and Development Services. Except in the case of cultural items that fall within the scope of the Native American Grave Protection and Repatriation Act, the discovery of any cultural resource within the project area shall not be grounds for a "stop work" notice or otherwise interfere with the project's continuation except as set forth in this paragraph. In the event of an unanticipated discovery of archaeological materials during construction, the project Applicant shall retain the services of a Qualified Professional Archaeologist meeting the Secretary of the Interior's Standards for a Qualified Archaeologist to evaluate the significance of the materials prior to resuming any construction-related activities in the vicinity of the find. If the Qualified Archaeologist determines that the discovery constitutes a significant resource under CEQA and it cannot be avoided, the project Applicant shall implement an archaeological data recovery program.
- **CUL-4 Schedule of Ground-Disturbing Activities.** The construction contractor shall provide the Supervising Archaeological Resources Specialist with a schedule of initial potential ground-disturbing activities. A minimum of 48 hours will be provided of commencement of any initial ground-disturbing activities such as vegetation grubbing or clearing, grading, trenching, or mass excavation.

As detailed in the schedule provided, an Archaeological Monitor shall be present on site at the commencement of ground-disturbing activities related to the project. The monitor, in consultation with the Supervising Archaeologist, shall observe initial ground-disturbing activities and, as they proceed, make adjustments to the number of monitors as needed to provide adequate observation and oversight. All monitors will have stop-work authority to allow for recordation and evaluation of finds during construction. The monitor will maintain a daily record of observations to serve as an ongoing reference resource and to provide a resource for final reporting upon completion of the project.

The Supervising Archaeologist, Archaeological Monitor, and the lead contractor and subcontractors shall maintain a line of communication regarding schedule and activity such that the monitor is aware of all ground-disturbing activities in advance in order to provide appropriate oversight.

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- **CUL-5 Discovery of Archaeological Resources.** If archaeological resources are discovered, construction shall be halted within 50 feet of the find and shall not resume until a Qualified Archaeologist can determine the significance of the find and/or the find has been fully investigated, documented, and cleared.
- Archaeological Resources Monitoring Report. At the completion of all ground-disturbing activities, the Qualified Archaeologist shall prepare an Archaeological Resources Monitoring Report summarizing all monitoring efforts and observations, as performed, and any and all prehistoric or historic archaeological finds as well as providing follow-up reports of any finds to the South Coastal Information Center (SCIC), as required.

Significance After Mitigation

With the implementation of Mitigation Measures CUL-1 through CUL-6, impacts to potential historical resources during construction would be reduced to a level less than significant by requiring construction monitoring, WEAP training, and proper handling and documentation of previously undiscovered historic resources.

Impact 3.6-2 Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

Pursuant to CEQA Guidelines §15064.5(c)(1) and (2), an archaeological resource includes an archaeological site that qualifies as a significant historical resource as described for Impact 3.6-1. If an archaeological site does not meet any of the criteria outlined in the provisions under Impact 3.6-1, but meets the definition of a "unique archaeological resource" in PRC 21083.2, the site shall be treated in accordance with the provisions of PRC 21083.2, unless the project applicant and public agency elect to comply with all other applicable provisions of CEQA with regards to archaeological resources. "Unique archaeological resource" means an archaeological artifact, object or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- 1) Contains information needed to answer important scientific research questions that there is a demonstrable public interest in that information.
- 2) Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- Is directly associated with a scientifically recognized important historic event or person.

CEQA Guidelines 15064.5(c)(4) confirms that if an archaeological resource is neither a unique archaeological nor an historic resource, the effects of the project on those resources shall not be considered a significant effect on the environment.

Based on the field survey conducted for the project, much of the proposed project survey area was vegetated by agricultural fields while others were in areas previously disturbed for placement of water channels and culverts for agricultural purposes. The disturbed surface and subsurface of the project area from agricultural activity and construction of channels and culverts have likely destroyed any intact potential prehistoric or historic-era cultural resources. The potential of finding a buried archaeological site during construction is considered low. However, like all construction projects in the state, the possibility exists. This potential impact is considered significant. Implementation of Mitigation

Measures CUL-1 through CUL-6 would reduce the potential impact associated with the inadvertent discovery of archaeological resources to a level less than significant.

Impact 3.6-3 Would the project disturb any human remains, including those interred outside of dedicated cemeteries?

During the construction and operational phases of the proposed project, grading, excavation and trenching will be required. Although the potential for encountering subsurface human remains within the project site is low, there remains a possibility that human remains are present beneath the ground surface, and that such remains could be exposed during construction. The potential to encounter human remains is considered a significant impact. Mitigation Measure CUL-7 would ensure that the potential impact on previously unknown human remains does not rise to the level of significance pursuant to CEQA.

Mitigation Measure(s)

CUL-7

Discovery of Human Remains. In the unlikely event that human remains are discovered during ground-disturbing activities, then the proposed project would be subject to California Health and Safety Code 7050.5, CEQA Section 15064.5, and California Public Resources Code Section 5097.98 (NPS 1983). If human remains are found during ground-disturbing activities, State of California Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the Imperial County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. In the event of an unanticipated discovery of human remains, the Imperial County Coroner shall be notified immediately. If the human remains are determined to be prehistoric, the County Coroner shall notify the NAHC, which shall notify a most likely descendant (MLD). The MLD shall complete the inspection of the site within 48 hours of notification and may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.

Significance After Mitigation

With the implementation of Mitigation Measure CUL-7, potential impacts from encountering human remains during ground-disturbing construction activities would be reduced to a level than significant with adherence to California Health and Safety Code 7050.5, CEQA Section 15064.5, and California Public Resources Code Section 5097.98 (NPS 1983).

3.6.4 Decommissioning/Restoration and Residual Impacts

Decommissioning/Restoration

If at the end of the PPA term, no contract extension is available for a power purchaser, no other buyer of the energy emerges, or there is no further funding of the project, the project will be decommissioned and dismantled. No impact is anticipated from restoration activities as the ground disturbance and associated impacts on cultural resources will have occurred during the construction phase of the proposed project.

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Residual

Implementation of Mitigation Measure CUL-1 and CUL-2 would require a supervising monitor to monitor all ground disturbing activity and to provide WEAP training to workers to reduce potential impacts on historical resources to a level less than significant. Implementation of Mitigation Measures CUL-3, CUL-4, and CUL-5 would reduce the potential impact associated with the inadvertent discovery of archaeological resources to a level less than significant. At the completion of decommissioning construction activities, an Archaeological Resources Monitoring Report will be prepared to summarize all monitoring efforts and observations, as performed, and all prehistoric or historic archaeological finds per Mitigation Measure CUL-6. Mitigation Measure CUL-7 would ensure that the potential impact on previously unknown human remains does not rise to the level of significance pursuant to CEQA. No unmitigable impacts on cultural resources would occur with implementation of the proposed project.

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3.7 Geology and Soils

This section includes an evaluation of the project in relation to existing geologic and soils conditions within the project site. Information contained in this section is summarized from the *Geotechnical Feasibility Study* prepared by Chambers Group (Appendix F of this EIR) and the *Archaeological and Paleontological Assessment Report for the Brawley Solar Project* prepared by Chambers Group (Appendix E of this EIR).

3.7.1 Existing Conditions

Regional Geology

The project site is located in Imperial County in the Salton Trough geomorphic province of California. The Salton Trough encompasses the Coachella, Imperial and Mexicali Valley which extend from northeast of Palm Springs near San Gorgonio Pass to the Gulf of California. The Imperial Valley is bounded by the Chocolate Mountains to the northeast, the Salton Sea to the north, the Peninsular Ranges to the Southwest, and Mexicali Valley to the south, and is dominated by lacustrine and alluvial sediments. Unexposed succession of Tertiary- and Quaternary-aged sedimentary rocks lie below the alluvial and lake sediments from depths of 11,000 feet or more. Basement rocks consisting of Mesozoic granite and probably Paleozoic metamorphic rocks are estimated to exist at depths between 15,000 and 20,000 feet (Appendix F of this EIR).

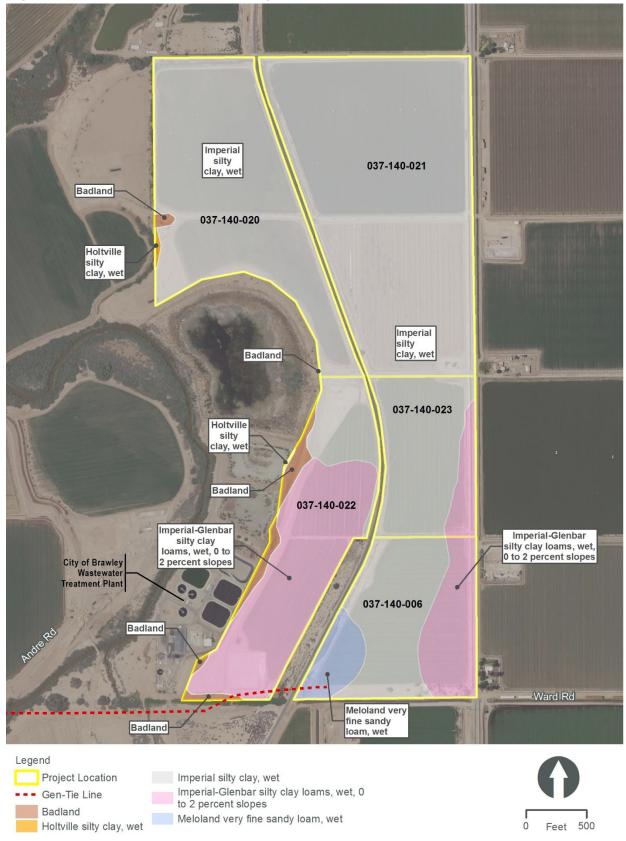
The geologic conditions present within the County contribute to a wide variety of hazards that can result in loss of life, bodily injury, and property damage. The primary seismic hazard at the project site is the potential for strong ground shaking. The Salton Trough is a seismically active area and the Imperial Valley in particular has numerous northwest-treading active faults.

Local Geology and Surface Conditions

The project site is generally within the floodplain of the New River and underlain by Quaternary Lake Deposits. The Western Boundary of the project site which has a descending slope is the former bank of the New River. The surface of the project site is observed to contain a topsoil/tilled horizon related to previous agricultural usage of the project site, and minor amounts of undocumented artificial fill related to the boundary roads and paths, adjacent drainage channels, and the railway that bisects the site. The fill in these areas include local lean, to fat clay derived from the native lake deposits. The dominant geologic unit below the project site is young lake deposits which consist of silts and clays with occasional interbeds of silty sand (Appendix F of this EIR). As shown on Figure 3.7-1, soil series mapped on the project site include:

- 102 Badland
- 110 Holtville silty clay, wet
- 114 Imperial silty clay, wet
- 115 Imperial-Glenbar silty clay loams, wet, 0 to 2 percent slopes
- 122 Meloland very fine sandy loam, wet

Figure 3.7-1. Soils Mapped on the Project Site



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Groundwater Conditions

Groundwater was encountered at approximately 42 feet below the existing grade in the western end of the project site, and perched groundwater was encountered at approximately 12 feet below grade in the northeast corner of the site. Within the project site, water is channeled within the drainage ditches and channels along the northern and southern property lines just below surface elevation. Additionally, six geothermal wells are present throughout the site.

Faulting and Seismicity

Earthquakes are the result of an abrupt release of energy stored in the earth. This energy is generated from the forces which cause the continents to change their relative position on the earth's surface, a process called "continental drift." The earth's outer shell is composed of a number of relatively rigid plates which move slowly over the comparatively fluid molten layer below. The boundaries between plates are where the more active geologic processes take place. Earthquakes are an incidental product of these processes.

Southern California straddles the boundary between two global tectonic plates known as the North American Plate (on the east) and the Pacific Plate (on the west). The main plate boundary is represented by the San Andreas Fault, which extends northwest from the Gulf of California in Mexico, through the desert region of the Imperial Valley, through the San Bernardino region, and into Northern California, where it eventually trends offshore, north of San Francisco (Appendix F of this EIR).

In Southern California, the plate boundary is a complex system of numerous faults known as the San Andreas Fault System that spans a 150-mile-wide zone from the main San Andreas fault in the Imperial Valley westward to offshore of San Diego. As shown in Figure 3.7-2, the closest active faults to the project site include: the Brawley Seismic Zone which is approximately 2.4 miles to the west, the Imperial Fault which is approximate 8.3 miles to the south, the Superstition Hills Fault which is approximately 11.9 miles to the southwest, the Superstition Mountain Fault which is approximately 14.5 miles to the southwest, the Elmore Ranch Fault which is approximately 15.8 miles to the west, and the San Andreas Fault which is 25.5 miles to the northwest (Appendix F of this EIR).

The project site is within an active tectonic area with several significant faults that are capable of producing moderate to strong earthquakes. The Imperial Fault, Superstition Hills Fault, and Superstition Mountain Fault are the three closest faults to the project site. Based on probabilistic analysis from the California Geological survey website, the peak ground acceleration at the project site is estimated to be approximated 0.48g, based on a probability of 10 percent in 50 years (Appendix F of this EIR).

Seismic Ground Shaking

Ground shaking is the byproduct of an earthquake and is the energy created as rocks break and slip along a fault during an earthquake. The amount of ground shaking that an area may be subject to during an earthquake is related to the proximity of the area to the fault, the depth of the hypocenter (focal depth), location of the epicenter and the size (magnitude) of the earthquake. Soil type also plays a role in the intensity of shaking. Bedrock or other dense or consolidated materials are less prone to intense ground shaking than soils formed from alluvial deposition.

As the project site is located in the seismically active southern California region, strong ground shaking can be expected at the project site during moderate to severe earthquakes in the general region.

Surface Rupture

Surface rupture occurs when movement along a fault results in actual cracking or breaking of the ground along a fault during an earthquake; however, it is important to note that not all earthquakes result in surface rupture. Surface rupture almost always follows preexisting fault traces, which are zones of weakness. Rupture may occur suddenly during an earthquake or slowly in the form of fault creep. Fault creep is the slow rupture of the earth's crust. Sudden displacements are more damaging to structures because they are accompanied by shaking.

The California Geologic Survey (CGS) established criteria for faults as active, potentially active, and inactive. Active faults are those that show evidence of surface displacement within the last 11,000 years (Holocene age). Potentially active faults are those that demonstrate displacement within the past 1.6 million years (Quaternary age). Faults showing no evidence of displacement within the last 1.6 million years may be, in general, considered inactive for most structures, except for critical structures (Appendix F of this EIR).

In 1972 the Alquist-Priolo Special Studies Earthquake Hazards Act (APEHA) was passed, which required fault studies within 500 feet of active or potentially active faults. The APEHA designates "active" and "potentially active" faults utilizing the same age criteria as that used by the CGS. The project site is not located within a currently mapped APEHA zone. As previously mentioned above, the nearest active major fault is the Brawley Seismic Zone which is approximately 2.4 miles to the west of the project site (Appendix F of this EIR). Based on this distance, the potential for surface fault rupture to occur on the project site is considered low.

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Figure 3.7-2. Regional Fault Map



Liquefaction

Liquefaction occurs when granular soil below the water table is subjected to vibratory motions, such as those produced by earthquakes. With strong ground shaking, an increase in pore water pressure develops as the soil tends to reduce in volume. If the increase in pore water pressure is sufficient to reduce the vertical effective stress (suspending the soil particles in water), the soil strength decreases, and the soil behaves as a liquid (similar to quicksand). The factors known to influence liquefaction potential include soil type, relative density, grain size distribution, confining pressure, depth to groundwater, and the intensity and duration of the seismic ground shaking. Liquefaction is most prevalent in loose- to medium-dense, silty, sandy, and gravelly soils below the groundwater table.

The predominate soil type encountered in the borings include fine-grained silts and clays. Based on site observation of the soil encountered during drilling for exploratory borings and the lack of shallow groundwater table, the potential for liquefaction at the project site is considered to be very low. (Appendix F of this EIR).

Landslides

Landslides are the descent of rock or debris caused by natural factors, such as the pull of gravity, fractured or weak bedrock, heavy rainfall, erosion, and earthquakes. The project site has a relatively flat topography; therefore, the potential for landsliding is considered negligible (Appendix F of this EIR). Additionally, according to the County of Imperial General Plan, Seismic and Public Safety Element (County of Imperial 1997a), the project site is not within an area with moderate or low potentials for landslides.

Lateral Spreading

Lateral spreading typically occurs as a form of horizontal displacement of relatively flat lying alluvial material toward an open or "free" face such as an open body of water, channel, or excavation. This movement is generally due to failure along a weak plane, and may often be associated with liquefaction. As cracks develop within the weakened material, blocks of soil displace laterally toward the open face. Cracking and lateral movement may gradually propagate away from the face as blocks continue to break free. Based on the site conditions and gentle to relatively flat topography across the majority of the project site, lateral spreading is considered unlikely (Appendix F of this EIR).

Land Subsidence

Land subsidence is the sinking of the ground surface caused by the compression of earth materials or the loss of subsurface soil because of underground mining, tunneling, or erosion. The major causes of subsidence include fluid withdrawal from the ground, decomposing organics, underground mining or tunneling, and placing large fills over compressible earth materials. The effective stress on underlying soils is increased resulting in consolidation and settlement. Subsidence may also be caused by tectonic processes. Based on the site conditions and gentle to relatively flat topography across the majority of the project site, ground subsidence is considered unlikely (Appendix F of this EIR).

Expansive Soils

Expansive soils are characterized by their ability to undergo significant volume changes (shrink or swell) due to variations in moisture content. Changes in soil moisture content can result from precipitation, landscape irrigation, utility leakage, roof drainage, perched groundwater, drought, or

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other factors and may result in unacceptable settlement or heave of structures. Expansive soils are known to be present throughout the Imperial Valley and based on preliminary laboratory testing, medium to highly expansive soils were encountered within the upper 5 feet of the project site. As previously stated, the project site is predominately underlain by fine-grained silts and clays. Generally, sands are considered not expansive while soils and clays may exhibit moderate to high expansion potential due to variation in moisture content (Appendix F of this EIR).

Collapsible Soils

Collapsible soil is generally defined as soil that will undergo a sudden decrease in volume and its internal support is lost under applied loads when water is introduced into the soil. The internal support is considered to be a temporary strength and is derived from a number of sources including capillary tension, cementing agents, e.g. iron oxide and calcium carbonate, clay-welding of grains, silt bonds, clay bonds and clay bridges. Soils found to be most susceptible to collapse include loess (fine grained wind-deposited soils), valley alluvium deposited within a semi-arid to arid climate, and residual soil deposits. It is unknown whether collapsible soils are present on the project site.

Corrosive Soils

Corrosive soils can damage underground utilities including pipelines and cables, or weaken roadway structures. Based on screening tests conducted on a representative sample of near surface soils, severely corrosive soils to both concrete material and metallic elements are present (Appendix F of this EIR).

Paleontological Resources

Paleontological resources (fossils) are the remains of prehistoric plant and animal life. Fossil remains, such as bones teeth, shell, and wood, are found in geologic deposits (rock formations) within which they were originally buried. Many paleontological fossil sites are recorded in Imperial County and have been discovered during construction activities. Paleontological resources are typically impacted when earthwork activities, such as mass excavation cut into geological deposits (formations) with buried fossils.

Late Pleistocene to Holocene Lake Cahuilla deposits exposed and/or underlying the proposed project area consist of dark brown to gray, silty clays interpreted as freshwater lacustrine; and, in drainages where exposed, these same sediments are interbedded with finer to medium sands containing pebbles. The Lake Cahuilla Beds have yielded well-preserved subfossil remains of freshwater clams and snails and sparse remains of freshwater fish. The paleontological resources of the Lake Cahuilla Beds are considered significant because of the paleoclimatic and palaeoecological information they can provide, and these deposits are therefore assigned a high paleontological potential. Therefore, although no paleontological resources were discovered during the survey within exposed cuts, the site does have paleontological sensitivity, with high potential for paleontological resource discovery (Appendix E of this EIR).

3.7.2 Regulatory Setting

This section identifies and summarizes laws, policies, and regulations that are applicable to the project.

Federal

Earthquake Hazards Reduction Act

The Earthquake Hazards Reduction Act was enacted in 1977 to "reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards and reduction program." To accomplish this, the Act established the National Earthquake Hazards Reduction Program (NEHRP). This program was significantly amended in November 1990 by NEHRP, which refined the description of agency responsibilities, program goals, and objectives.

NEHRP's mission includes improved understanding, characterization, and prediction of hazards and vulnerabilities; improvement of building codes and land use practices; risk reduction through post-earthquake investigations and education; development and improvement of design and construction techniques; improvement of mitigation capacity; and accelerated application of research results. The NEHRP designates the Federal Emergency Management Agency as the lead agency of the program and assigns it several planning, coordinating, and reporting responsibilities. Programs under NEHRP help inform and guide planning and building code requirements such as emergency evacuation responsibilities and seismic code standards such as those to which the project would be required to adhere.

State

Alquist-Priolo Special Studies Earthquake Hazards Act

The APEHA was passed into law following the destructive February 9, 1971 San Fernando earthquake. The APEHA provides a mechanism for reducing losses from surface fault rupture on a statewide basis. The intent of the APEHA is to ensure public safety by prohibiting the siting of most structures for human occupancy across traces of active faults that constitute a potential hazard to structures from surface faulting or fault creep. The state geologist (Chief of the California Division of Mines and Geology) is required to identify "earthquake fault zones" along known active faults in California. Counties and cities must withhold development permits for human occupancy projects within these zones unless geologic studies demonstrate that there would be no issues associated with the development of projects. The project site is not located within a currently mapped APEHA zone.

California Building Code

The California Building Standards Commission is responsible for coordinating, managing, adopting, and approving building codes in California. CCR Title 24 is reserved for state regulations that govern the design and construction of buildings, associated facilities, and equipment, known as building standards. The California Building Code (CBC) is based on the Federal Uniform Building Code used widely throughout the country (generally adopted on a state-by-state or district-by-district basis). The California Health and Safety Code (HSC) Section and 18980 HSC Section 18902 give CCR Title 24 the name of California Building Standards Code. The updates to the 2019 California Building Standards Code were published on January 1, 2021, with an effective date of July 1, 2021.

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Local

County of Imperial Land Use Ordinance

Title 9 Division 15 (Geological Hazards) of the County Land Use Ordinance has established procedures and standards for development within earthquake fault zones. Per County regulations, construction of buildings intended for human occupancy are prohibited across the trace of an active fault. An exception exists when such buildings located near the fault or within a designated Special Studies Zone are demonstrated through a geotechnical analysis and report not to expose a person to undue hazard created by the construction.

County of Imperial General Plan

The County of Imperial General Plan, Seismic and Public Safety Element identifies potential natural and human-induced hazards and provides policy to avoid or minimize the risk associated with hazards. The Seismic and Public Safety Element identifies 'lifelines and critical facilities' whose disruption could endanger the public safety. Lifelines are defined as networks of services that extend over a wide area and are vital to the public welfare, and can be classified into four categories: energy, water, transportation, and communications. The IID has a formal Disaster Readiness Standard Operating Procedure for the Water Department, Power Department, and the entire District staff for response to earthquakes and other emergencies.

Table 3.7-1 analyzes the consistency of the project with specific policies contained in the County of Imperial General Plan associated with geology, soils, and seismicity. While this EIR analyzes the project's consistency with the General Plan pursuant to CEQA Guidelines Section 15125(d), the Imperial County Board of Supervisors ultimately determines consistency with the General Plan.

Table 3.7-1. Project Consistency with Applicable General Plan Policies

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General Plan Policies	Consistency with General Plan	Analysis			
Seismic and Public Safety Element					
Goal 1. Include public health and safety considerations in land use planning.	Consistent	Division 15 of the County Land Use Ordinance has established procedures and standards for development within earthquake fault zones.			
Objective 1.1. Ensure that data on geological hazards is incorporated into the land use review process, and future development process.		Per County regulations, construction of buildings intended for human occupancy which are located across the trace of an active fault are prohibited. An exception exists when such buildings located near the fault or within			
Objective 1.3. Regulate development adjacent to or near all mineral deposits and geothermal operations.		a designated Special Studies Zone are demonstrated through a geotechnical analysis and report not to expose a person to undue hazard created by the construction.			
Objective 1.4. Require, where possessing the authority, that avoidable seismic risks be avoided; and that measures, commensurate with risks, be taken to reduce injury, loss of life, destruction of property, and disruption of service.		Since the project site is located in a seismically active area, the project is required to be designed in accordance with the CBC for near source factors derived from a design basis earthquake based on a peak ground acceleration of 0.48 gravity. It should be noted			

Table 3.7-1. Project Consistency with Applicable General Plan Policies

General Plan Policies	Consistency with General Plan	Analysis	
Objective 1.7. Require developers to provide information related to geologic and seismic hazards when siting a proposed project.		that, the project would be remotely operated and would not require any habitable structure on site. In considering these factors in conjunction with mitigation requirements	
Goal 2: Minimize potential hazards to public health, safety, and welfare and prevent the loss of life and damage to health and property		outlined in the impact analysis, the risks associated with seismic hazards would be minimized.	
resulting from both natural and human-related phenomena.		A preliminary geotechnical study has been prepared for the proposed project. The preliminary geotechnical study has been	
Objective 2.2. Reduce risk and damage due to seismic hazards by appropriate regulation.		referenced in this environmental document. Additionally, a design-level geotechnical investigation will be conducted to evaluate the	
Objective 2.5 Minimize injury, loss of life, and damage to property by implementing all state codes where applicable.		potential for site specific hazards associated with seismic activity.	
Objective 2.8 Prevent and reduce death, injuries, property damage, and economic and social dislocation resulting from natural hazards including flooding, land subsidence, earthquakes, other geologic phenomena, levee or dam failure, urban and wildland fires and building collapse by appropriate planning and emergency measures.			

Source: County of Imperial 1997

3.7.3 Impacts and Mitigation Measures

This section presents the significance criteria used for considering project impacts related to geologic and soil conditions, the methodology employed for the evaluation, an impact evaluation, and mitigation requirements, if necessary.

Thresholds of Significance

Based on CEQA Guidelines Appendix G, project impacts related to geology and soils are considered significant if any of the following occur:

- Directly or indirectly cause potential substantive adverse effects, including the risk of loss, injury, or death involving:
 - Rupture of a known earthquake fault, as delineated on the most recent AP 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)
 - Strong seismic ground shaking
 - Seismic related ground failure, including liquefaction
 - Landslides

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- Result in substantial soil erosion or the loss of topsoil
- 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
- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property
- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of waste water
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature

Methodology

This analysis evaluates the potential for the project, as described in Chapter 2, Project Description, to interact with local geologic and soil conditions, as well as paleontological resources on the project site. A *Geotechnical Feasibility Study* prepared by Chambers Group (Appendix F of this EIR) and *Archaeological and Paleontological Assessment Report for the Brawley Solar Project* prepared by Chambers Group (Appendix E of this EIR) was prepared for the project. The information obtained from these studies were reviewed and summarized to present the existing geologic and soil conditions on the project site. This analysis considers whether these conditions would result in an exceedance of one or more of the applied significance criteria as identified above.

Impact Analysis

Impact 3.7-1 Would the project directly or indirectly cause potential substantive adverse effects, including the risk of loss, injury, or death involving:

Rupture of a known earthquake fault, as delineated on the most recent AP 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)?

As previously discussed above, the project site is located in the seismically active Imperial Valley of southern California with several mapped faults of the San Andreas Fault System traversing the region. As shown in Figure 3.7-2, the project site is not located on an active fault. Furthermore, no portion of the project site is within or near a designated APEHA zone, and, therefore, the potential for ground rupture to occur within the project site is considered unlikely. As such, the probability of surface fault rupture within the project site during construction and operation is considered low and the project would not increase or exacerbate existing hazards related to fault rupture. The proposed project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving rupture of a major fault as delineated on the most recent Alquist-Priolo Fault Zoning map. This impact would be less than significant.

Mitigation Measure(s)

No mitigation measures are required.

Impact 3.7-2 Would the project directly or indirectly cause potential substantive adverse effects, including the risk of loss, injury, or death involving:

Strong seismic ground shaking?

As previously discussed above, the closest mapped fault to the project site is the Brawley Seismic Zone which is approximately 2.4 miles to the west. In the event of an earthquake along this fault or another regional fault, seismic hazards related to ground motion could occur in susceptible areas within the project site. The intensity of such an event would depend on the causative fault and the distance to the epicenter, the moment magnitude, and the duration of shaking.

Even with the integration of building standards that are designed to resist the effects of strong ground motion, ground shaking within the project site could cause some structural damage to the facility structures or, at least, cause unsecured objects to fall. During a stronger seismic event, ground shaking could result in structural damage or collapse of electrical distribution facilities. Given the potentially hazardous nature of the project facilities, the potential impact of ground motion during an earthquake is considered a significant impact, as proposed structures, such as the substation and transmission lines could be damaged. However, the proposed project would be constructed in accordance with the applicable geotechnical and seismic design standards as well as the site-specific design recommendations in the final geotechnical report per Mitigation Measure GEO-1; and upon operation, the project would not result in any significant changes related to the risk of seismic hazards on the project site when compared to existing conditions, nor would project operation increase or exacerbate the potential for strong seismic ground shaking to occur. Impacts would be less than significant.

Mitigation Measure(s)

GEO-1Prepare Geotechnical Report(s) as Part of Final Engineering for the Project and Implement Required Measures. Facility design for all project components shall comply with the site-specific design recommendations as provided by a licensed geotechnical or civil engineer to be retained by the project applicant. The final geotechnical and/or civil engineering report shall address and make recommendations on the following:

- Site preparation
- Soil bearing capacity
- Appropriate sources and types of fill
- Potential need for soil amendments
- Structural foundations
- Grading practices
- Soil corrosion of concrete and steel
- Erosion/winterization
- Seismic ground shaking
- Liquefaction

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Expansive/unstable soils

In addition to the recommendations for the conditions listed above, the geotechnical investigation shall include subsurface testing of soil and groundwater conditions, and shall determine appropriate foundation designs that are consistent with the version of the CBC that is applicable at the time building and grading permits are applied for. All recommendations contained in the final geotechnical engineering report shall be implemented by the project applicant. The final geotechnical and/or civil engineering report shall be submitted to Imperial County Public Works Department, Engineering Division for review and approval prior to issuance of building permits.

Significance after Mitigation

With implementation of Mitigation Measure GEO-1, potential impacts associated with strong seismic ground shaking would be reduced to a level less than significant with the implementation of recommendations made by a licensed geotechnical engineer in compliance with the CBC prepared as part of a formal geotechnical investigation.

Impact 3.7-3 Would the project directly or indirectly cause potential substantive adverse effects, including the risk of loss, injury, or death involving:

Seismic related ground failure, including liquefaction?

As previously discussed above, the factors known to influence liquefaction potential include soil type, relative density, grain size distribution, confining pressure, depth to groundwater, and the intensity and duration of the seismic ground shaking. Liquefaction is most prevalent in loose- to medium-dense, silty, sandy, and gravelly soils below the groundwater table.

The predominate soil type encountered in the borings include fine-grained silts and clays. Based on site observation of the soil encountered during drilling for exploratory borings, the potential for liquefaction at the project site is considered to be very low (Appendix F of this EIR). However, given that the project site is underlain by fine-grained silts and clays, there is a potential for liquefaction to occur on the project site. Additional geotechnical investigation would be required in order to assess the risk of liquefaction on the project site. The potential impact on liquefaction is considered a significant impact. Implementation of Mitigation Measure GEO-1, which requires the preparation of a design-level geotechnical report, would reduce the potential impact associated with liquefaction to a level less than significant.

Mitigation Measure(s)

No additional mitigation measures beyond Mitigation Measure GEO-1 are required.

Significance after Mitigation

With implementation of Mitigation Measure GEO-1, potential impacts associated with seismic ground failure such as liquefaction would be reduced to a level less than significant with the implementation of recommendations made by a licensed geotechnical engineer in compliance with the CBC prepared as part of a formal geotechnical investigation.

Impact 3.7-4 Would the project directly or indirectly cause potential substantive adverse effects, including the risk of loss, injury, or death involving:

Landslides?

Along the western boundary of the project site, there is a descending slope where there is a potential for general slope instability. The southern portion of this slope does appear to have been recently graded while the northern portion appears to be natural and in a somewhat over-steepened condition. Minor slumping was also observed within localized areas of this natural descending slope, as well as several areas that were heavily eroded. However, as stated above, the project site has a relatively flat topographic gradient to the north, east, and west of the site; and runoff water is allowed to freely drain over the top of the observed slope. Based on these factors the potential for a landslide is considered negligible (Appendix F of this EIR). Therefore, the project would not directly or indirectly cause potential substantive adverse effects, including the risk of loss, injury, or death involving landslides and no impact would occur.

Mitigation Measure(s)

No mitigation measures are required.

Impact 3.7-5 Would the project result in substantial soil erosion or the loss of topsoil?

During the site grading and construction phases, large areas of unvegetated soil would be exposed to erosive forces by water for extended periods of time due to ICAPCD dust suppression requirements. Unvegetated soils are much more likely to erode from precipitation than vegetated areas because plants act to disperse, infiltrate, and retain water. Construction activities will involve demolition and grubbing, grading of the project site to establish access roads and pads for electrical equipment, trenching for underground electrical collection lines, and the installation of solar equipment and security fencing which could result in increased erosion and sedimentation to surface waters. Construction could produce sediment-laden stormwater runoff (nonpoint source pollution), a major contributor to the degradation of water quality. If precautions are not taken to contain contaminants, construction-related erosion impacts are considered a significant impact.

As provided in Mitigation Measure GEO-1, during final engineering for the project, a design-level geotechnical study would identify appropriate measures for the project related to soil erosion. In addition, as part of Mitigation Measure HYD-1 provided in Section 3.10 Hydrology/Water Quality, potential impacts from erosion during construction activities would be reduced to a level less than significant with the preparation of a SWPPP for sediment and erosion control and implementation of BMPs to reduce erosion from the construction site.

The project is not expected to result in substantial soil erosion or the loss of topsoil over the long term. The project applicant would be required to implement on-site erosion control measures in accordance with County standards, which require the preparation, review, and approval of a grading plan by the County Engineer. Therefore, with implementation of Mitigation Measure GEO-1 and Mitigation Measure HYD-1 identified in Section 3.10 Hydrology/Water Quality, impacts from construction-related erosion would be reduced to a level less than significant.

Mitigation Measure(s)

No additional mitigation measures beyond Mitigation Measure GEO-1 and Mitigation Measure HYD-1 are required.

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Significance after Mitigation

With implementation of Mitigation Measure GEO-1 and Mitigation Measure HYD-1 in Section 3.10 Hydrology/Water Quality, potential impacts from erosion during construction activities would be reduced to a level less than significant with the preparation of a SWPPP and implementation of BMPs to reduce erosion from the construction site.

Impact 3.7-6 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?

Based on the site conditions and gentle to relatively flat topography across the majority of the project site, lateral spreading is considered unlikely. However, additional geotechnical investigation would be required in order to assess the risk of lateral spreading to occur on the project site. The potential impact associated with lateral spreading is considered a significant impact.

The general project area is not experiencing subsidence which it typically attributed to the extraction of groundwater. The proposed project facility is not expected to exacerbate or otherwise trigger significant subsidence; however, there are six geothermal wells on the project site that could potentially result in subsidence if large quantities of ground water are extracted, lowering the water table. Therefore, further geotechnical investigation would be required in order to address the issue of potential subsidence related to the operation of these geothermal wells. The potential impact associated with lateral spreading is considered a significant impact.

As described above, given that the project site is predominately underlain by fine-grained silts and clays and based on site observation of the soil encountered during drilling for exploratory borings and the lack of shallow groundwater table, the potential for liquefaction at the project site is considered to be very low. Additional geotechnical investigation would be required in order to assess the risk of liquefaction on the project site. The potential impact on liquefaction is considered a significant impact.

It is unknown whether collapsible soils are present on the project site. Additional geotechnical investigation would be required in order to assess the risk of collapsible soils to occur on the project site. The potential impact associated with collapsible soils is considered a significant impact.

Implementation of Mitigation Measure GEO-1, which requires the preparation of a design-level geotechnical report, would reduce the potential impacts associated with lateral spreading, liquefaction, and collapsible soils to a level less than significant.

Mitigation Measure(s)

No additional mitigation measures beyond Mitigation Measure GEO-1 are required.

Significance after Mitigation

With implementation of Mitigation Measure GEO-1, potential impacts associated with lateral spreading, liquefaction, and collapsible soils would be reduced to a level less than significant with the implementation of recommendations made by a licensed geotechnical engineer in compliance with the CBC prepared as part of a formal geotechnical investigation.

Impact 3.7-7 Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

As stated above, expansive soils are characterized by their ability to undergo significant volume changes (shrink or swell) due to variations in moisture content. Changes in soil moisture content can result from precipitation, landscape irrigation, utility leakage, roof drainage, perched groundwater, drought, or other factors and may result in unacceptable settlement or heave of structures. The project site is predominately underlain by fine-grained silts and clays. According to Section 1803.5.3 of the 2010 CBC, these soils should be considered "expansive." Further, based on preliminary laboratory testing, medium to highly expansive soils were encountered within the upper 5 feet of the project site.

Therefore, unless properly mitigated, shrink-swell soils could exert additional pressure on buried structures and electrical connections producing shrinkage cracks that could allow water infiltration and compromise the integrity of backfill material. These conditions could be worsened if structural facilities are constructed directly on expansive soil materials. This potential impact would be significant as structures could be damaged by these types of soils.

Additionally, based on screening tests conducted on a representative sample of near surface soils, it was found that the soils contain a water-soluble sulfate content of 0.27 percent; therefore, a severe exposure to sulfates may be expected for concrete placed in contact with soil materials. Careful control of water-cement ratio and concrete compressive strength will be necessary in order to provide proper resistance again concrete deteriorate from sulfates. Further, the on-site soils, particularly clay/silty clay, are severely corrosive to ferrous metals and copper and can damage underground utilities including pipelines and cables or weaken roadway structures. Therefore, any ferrous metal or copper components of proposed project features that would be buried in direct contact with the site's soil would also need to be protected against detrimental effects of severely corrosive soil materials. A site-specific geotechnical investigation would be required at the project site to determine the extent and effect of problematic soils which have been identified during preliminary laboratory screenings of near surface on-site soils. Implementation of Mitigation Measure GEO-1, which requires the preparation of a design-level geotechnical report, would reduce potential impacts associated with expansive and corrosive soils to a level less than significant.

Mitigation Measure(s)

No additional mitigation measures beyond Mitigation Measure GEO-1 are required.

Impact 3.7-8 Would the project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of waste water?

The proposed project would not require an operations and maintenance building. The proposed solar facility would be remotely operated, controlled and monitored and with no requirement for daily on-site employees. Therefore, no septic or other wastewater disposal systems would be required for the project and no impact would occur.

Mitigation Measure(s)

No mitigation measures are required.

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Impact 3.7-9 Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

The Lake Cahuilla Beds have yielded well-preserved subfossil remains of freshwater clams and snails and sparse remains of freshwater fish. The paleontological resources of the Lake Cahuilla Beds are considered significant because of the paleoclimatic and palaeoecological information they can provide, and these deposits are therefore assigned a high paleontological potential. Therefore, the project site is considered to be paleontologically sensitive with a high potential for paleontological resource discovery (Appendix E of this EIR). Project construction has the potential to unearth and/or potentially destroy previously undiscovered paleontological resources. This potential impact is considered a significant impact. However, implementation of Mitigation Measures GEO-2, through GEO-7 would reduce the potential impact on paleontological resources to a level less than significant.

Mitigation Measure(s)

- **GEO-2** Paleontological Mitigation and Monitoring Plan. Once a geotechnical report has been completed for the project, a qualified paleontologist shall review the boring logs and determine how deep paleontologically sensitive formations may be across the project site. The paleontologist shall use this information along with the results of the paleontological survey to determine if paleontological monitoring is warranted. If monitoring is warranted, a qualified paleontologist shall prepare a mitigation and monitoring plan to be implemented during project construction.
- **Paleontological Monitoring.** Prior to construction, the project applicant shall retain the services of a Qualified Paleontologist and require that all initial ground-disturbing work be monitored by someone trained in fossil identification in monitoring contexts. A Supervising Paleontological Specialist and a Paleontological Monitor, to be retained by the project applicant, will be required to be present at the project construction phase kickoff meeting.
- GEO-4 Worker Awareness Program. Prior to any ground disturbance, the Supervising Paleontological Resources Specialist and Paleontological Resources Monitor shall conduct initial Worker Environmental Awareness Program (WEAP) training to all construction personnel, including supervisors, present at the outset of the project construction work phase, for which the Lead Contractor and all subcontractors shall make their personnel available. This WEAP training will educate construction personnel on how to work with the monitor(s) to identify and minimize impacts to paleontological resources and maintain environmental compliance and be performed periodically for new personnel coming on to the project as needed.
- **GEO-5 Schedule of Ground-Disturbing Activities.** During construction, the construction contractor shall provide the Supervising Paleontological Resources Specialist with a schedule of initial potential ground-disturbing activities. A minimum of 48 hours will be provided of commencement of any initial ground-disturbing activities such as vegetation grubbing or clearing, grading, trenching, or mass excavation.

As detailed in the schedule provided, a Paleontological Monitor shall be present on site at the commencement of ground-disturbing activities related to the project. The monitor, in consultation with the Supervising Paleontologist, shall observe initial ground-disturbing activities and, as they proceed, make adjustments to the number of

monitors as needed to provide adequate observation and oversight. All monitors will have stop-work authority to allow for recordation and evaluation of finds during construction. The monitor will maintain a daily record of observations to serve as an ongoing reference resource and to provide a resource for final reporting upon completion of the project.

The Supervising Paleontologist, Paleontological Monitor, and the Lead Contractor and subcontractors shall maintain a line of communication regarding schedule and activity such that the monitor is aware of all ground-disturbing activities in advance in order to provide appropriate oversight.

- **GEO-6 Discovery of Paleontological Resources.** During construction, if paleontological resources are discovered, construction shall be halted within 50 feet of any paleontological finds and shall not resume until a Qualified Paleontologist can determine the significance of the find and/or the find has been fully investigated, documented, and cleared.
- **GEO-7** Paleontological Resources Monitoring Report. At the completion of all ground-disturbing activities, the Supervising Paleontological Specialist shall prepare a Paleontological Resources Monitoring Report summarizing all monitoring efforts and observations, as performed, and any and all paleontological finds.

Significance after Mitigation

Implementation of Mitigation Measures GEO-2 through GEO-7 would reduce the potential impact on paleontological resources to a level less than significant. In the event that unanticipated paleontological resources or unique geologic resources are encountered during ground-disturbing activities, work must cease within 50 feet of the discovery and a paleontologist shall be hired to assess the scientific significance of the find.

3.7.4 Decommissioning/Restoration and Residual Impacts

Decommissioning/Restoration

If at the end of the PPA term, no contract extension is available for a power purchaser, no other buyer of the energy emerges, or there is no further funding of the project, the project will be decommissioned and dismantled. Decommissioning and restoration of the project site at the end of its use as a solar facility would involve the removal of structures and restoration to prior (pre-solar project) conditions. No geologic or soil impacts associated with the restoration activities would be anticipated, and, therefore, no impact is identified.

No impact is anticipated from restoration activities as the ground disturbance and associated impacts on paleontological resources will have occurred during the construction phase of the project.

Residual

With implementation of Mitigation Measure GEO-1, impacts related to strong seismic ground shaking, liquefaction, lateral spreading, collapsible soils, expansive soils, and corrosive soils would be reduced to a level less than significant. With implementation of Mitigation Measure GEO-1 and Mitigation Measure HYD-1 in Section 3.10 Hydrology/Water Quality, potential impacts from erosion during construction activities would be reduced to a level less than significant. Implementation of Mitigation Measures GEO-2 through GEO-7 would reduce the potential impact on paleontological resources to

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a level less than significant. The project would not result in residual significant and unmitigable impacts related to geology and soil resources.

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3.8 Greenhouse Gas Emissions

This section includes an overview of existing greenhouse gas (GHG) emissions within the project area and identifies applicable federal, state, and local policies related to global climate change. The impact assessment provides an evaluation of potential adverse effects with regards to GHG emissions based on criteria derived from the CEQA Guidelines in conjunction with actions proposed in Chapter 2, Project Description. Information contained in this section is summarized from the *Air Quality, Energy, and Greenhouse Gas Emissions Impact – Brawley Solar Energy Facility Project* prepared by Vista Environmental. This report is included in Appendix C of this EIR.

3.8.1 Existing Conditions

Greenhouse Gases

Constituent gases of the Earth's atmosphere, called atmospheric greenhouse gases (GHGs), play a critical role in the Earth's radiation amount by trapping infrared radiation from the Earth's surface, which otherwise would have escaped to space. Prominent greenhouse gases contributing to this process include carbon dioxide (CO₂), methane (CH₄), ozone, water vapor, nitrous oxide (N₂O), and chlorofluorocarbons (CFCs). This phenomenon, known as the Greenhouse Effect, is responsible for maintaining a habitable climate. Anthropogenic (caused or produced by humans) emissions of these greenhouse gases in excess of natural ambient concentrations are responsible for the enhancement of the Greenhouse Effect and have led to a trend of unnatural warming of the Earth's natural climate, known as global warming or climate change. Emissions of gases that induce global warming are attributable to human activities associated with industrial/manufacturing, agriculture, utilities, transportation, and residential land uses. Emissions of CO₂ and N₂O are byproducts of fossil fuel combustion. Methane, a potent greenhouse gas, results from off-gassing associated with agricultural practices and landfills. Sinks of CO₂, where CO₂ is stored outside of the atmosphere, include uptake by vegetation and dissolution into the ocean. The following provides a description of each of the GHGs.

Water Vapor. Water vapor is the most abundant, important, and variable GHG in the atmosphere. Water vapor is not considered a pollutant; in the atmosphere it maintains a climate necessary for life. Changes in its concentration are primarily considered a result of climate feedbacks related to the warming of the atmosphere rather than a direct result of industrialization. As the temperature of the atmosphere rises, more water is evaporated from ground storage (rivers, oceans, reservoirs, soil). Because the air is warmer, the relative humidity can be higher, leading to more water vapor in the atmosphere. As a GHG, the higher concentration of water vapor is then able to absorb more thermal indirect energy radiated from the Earth, thus further warming the atmosphere.

Carbon Dioxide. The natural production and absorption of CO₂ is achieved through the terrestrial biosphere and the ocean. However, humankind has altered the natural carbon cycle by burning coal, oil, natural gas, and wood. Since the industrial revolution began in the mid-1700s, each of these activities has increased in scale and distribution. Prior to the industrial revolution, concentrations were fairly stable at 280 parts per million (ppm). The International Panel on Climate Change (IPCC) indicates that concentrations were 379 ppm in 2005, an increase of more than 30 percent. Left unchecked, the IPCC projects that concentration of CO₂ in the atmosphere is projected to increase to a minimum of 540 ppm by 2100 as a direct result of anthropogenic sources. This could result in an

average global temperature rise of at least two degrees Celsius or 3.6 degrees Fahrenheit (Appendix C of this EIR).

Methane. CH₄ is an extremely effective absorber of radiation, although its atmospheric concentration is less than that of CO₂. Its lifetime in the atmosphere is brief (10 to 12 years), compared to some other GHGs (such as CO₂, N₂O, and CFCs). CH₄ has both natural and anthropogenic sources. It is released as part of the biological processes in low oxygen environments, such as in swamplands or in rice production. Over the last 50 years, human activities such as growing rice, raising cattle, using natural gas, and mining coal have added to the atmospheric concentration of methane. Other anthropocentric sources include fossil-fuel combustion and biomass burning.

Nitrous Oxide. N_2O is produced by microbial processes in soil and water, including those reactions which occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. N_2O is also commonly used as an aerosol spray propellant.

Chlorofluorocarbons. CFCs are nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (the level of air at the Earth's surface). CFCs have no natural source, but were first synthesized in 1928. They were used for refrigerants, aerosol propellants, and cleaning solvents. Due to the discovery that they are able to destroy stratospheric ozone, a global effort to halt their production was undertaken and in 1989 the European Community agreed to ban CFCs by 2000 and subsequent treaties banned CFCs worldwide by 2010. This effort was extremely successful, and the levels of the major CFCs are now remaining level or declining. However, their long atmospheric lifetimes mean that some of the CFCs will remain in the atmosphere for over 100 years.

Hydrofluorocarbons. Hydrofluorocarbons (HFCs) are synthetic man-made chemicals that are used as a substitute for CFCs. Out of all the GHGs, they are one of three groups with the highest global warming potential. The HFCs with the largest measured atmospheric abundances are (in order), HFC-23 (CHF₃), HFC-134a (CF₃CH₂F), and HFC-152a (CH₃CHF₂). Prior to 1990, the only significant emissions were HFC-23. HFC-134a use is increasing due to its use as a refrigerant. Concentrations of HFC-134a in the atmosphere are now about 10 parts per trillion (ppt) each. Concentrations of HFC-152a are about 1 ppt. HFCs are manmade for applications such as automobile air conditioners and refrigerants.

Perfluorocarbons. Perfluorocarbons (PFCs) have stable molecular structures and do not break down through the chemical processes in the lower atmosphere. High-energy ultraviolet rays about 60 kilometers above Earth's surface are able to destroy the compounds. Because of this, PFCs have very long lifetimes, between 10,000 and 50,000 years. Two common PFCs are tetrafluoromethane (C_{1}) and hexafluoroethane (C_{2}). Concentrations of C_{1} in the atmosphere are over 70 ppt. The two main sources of PFCs are primary aluminum production and semiconductor manufacturing.

Sulfur Hexafluoride. Sulfur Hexafluoride (SF₆) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. SF₆ has the highest global warming potential of any gas evaluated; 23,900 times that of CO₂. Concentrations in the 1990s were about 4 ppt. Sulfur hexafluoride is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

Aerosols. Aerosols are particles emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light. Sulfate aerosols are emitted when fuel containing sulfur is burned. Black carbon (or soot) is emitted during biomass burning due to the incomplete combustion of fossil

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fuels. Particulate matter regulation has been lowering aerosol concentrations in the United States; however, global concentrations are likely increasing.

Greenhouse Gas Emissions Inventory

In 2020, CARB released the 2020 edition of the California GHG inventory covering calendar year 2018 emissions. In 2018, California emitted 425.3 million gross metric tons of CO₂e including from imported electricity. The current inventory covers the years 2000 to 2018 and is summarized in Table 3.8-1. Data sources used to calculate this GHG inventory include California and Federal agencies, international organizations, and industry associations. The calculation methodologies are consistent with guidance from the IPCC. The 2000 emissions level is the sum total of sources from all sectors and categories in the inventory. The inventory is divided into seven broad sectors and categories in the inventory. These sectors include agriculture, commercial and residential, electric power, industrial, transportation, recycling and waste, and high GWP gases.

As shown in Table 3.8-1, combustion of fossil fuel in the transportation sector was the single largest source of California's GHG emissions in 2018, accounting for approximately 30 percent of total GHG emissions in the state.

Table 3.8-1. California Greenhouse Gas Emissions Inventory 2000 to 2018

Sector	Total 2000 Emissions (MMTCO₂e)	Total 2018 Emissions (MMTCO₂e)
Agriculture	30.97	32.57
Commercial and Residential	43.95	41.37
Electric Power	104.75	63.11
Industrial	96.18	89.18
Transportation	178.40	169.50
Recycling and Waste	7.67	9.09
High GWP Gases	6.28	20.46

Source: CARB 2020

Notes:

GWP=global warming potential; MMTCO2e=million metric tons of CO2 equivalent

Potential Effects of Climate Change

Globally, climate change has the potential to affect numerous environmental resources through uncertain impacts related to future air temperatures and precipitation patterns. Although climate change is driven by global atmospheric conditions, climate change impacts are felt locally. A scientific consensus confirms that climate change is already affecting California.

The California Natural Resources Agency's Fourth Climate Change Assessment (Fourth Assessment) produced updated climate projections that provide state-of-the-art understanding of different possible climate futures for California. The science is highly certain that California (and the world) will continue to warm and experience greater impacts from climate change in the future. While the IPCC and the National Climate Assessment have released descriptions of scientific consensus on climate change for the world and the U.S., respectively, the Fourth Assessment summarizes the current understanding of climate impacts and adaptation options in California (California Natural Resources Agency 2018). Projected changes in California include:

- **Temperatures:** If GHG emissions continue at current rates then California will experience average daily high temperatures that are warmer than the historical average by:
 - 2.7 Fahrenheit (°F) from 2006 to 2039
 - 5.8°F from 2040 to 2069
 - 8.8°F from 2070 to 2100
- Wildfire: One Fourth Assessment model suggests large wildfires (greater than 25,000 acres) could become 50 percent more frequent by the end of century if emissions are not reduced. The model produces more years with extremely high areas burned, even compared to the historically destructive wildfires of 2017 and 2018. By the end of the century, California could experience wildfires that burn up to a maximum of 178 percent more acres per year than current averages.
- Sea-Level Rise: If emissions continue at current rates, the Fourth Assessment model results
 indicate that total sea-level rise by 2100 is expected to be 54 inches, almost twice the rise that
 would occur if GHG emissions are lowered to reduce risk.
- **Snowpack:** By 2050, the average water supply from snowpack is projected to decline to 2/3 from historical levels. If emissions reductions do not occur, water from snowpack could fall to less than 1/3 of historical levels by 2100.
- Agriculture: Agricultural production could face climate-related water shortages of up to 16 percent in certain regions. Regardless of whether California receives more or less annual precipitation in the future, the state will be dryer because hotter conditions will increase the loss of soil moisture (California Natural Resources Agency 2018).

3.8.2 Regulatory Setting

This section identifies and summarizes federal, state, and local laws, policies, and regulations that are applicable to the project.

Federal

At the federal level, there is currently no overarching law related to climate change or the reduction of GHGs. The U.S. EPA is developing regulations under the CAA to be adopted in the near future, pursuant to the U.S. EPA's authority under the CAA. Foremost amongst recent developments have been the settlement agreements between the U.S. EPA, several states, and nongovernmental organizations to address GHG emissions from electric generating units and refineries; the U.S. Supreme Court's decision in Massachusetts v. EPA; and U.S. EPA's "Endangerment Finding," "Cause or Contribute Finding," and "Mandatory Reporting Rule." On September 20, 2013, the U.S. EPA issued

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a proposal to limit carbon pollution from new power plants. The U.S. EPA is proposing to set separate standards for natural gas-fired turbines and coal-fired units.

Although periodically debated in Congress, no federal legislation concerning GHG limitations has yet been adopted. In Coalition for Responsible Regulation, Inc., et al. v. EPA, the United States Court of Appeals upheld the U.S. EPA's authority to regulate GHG emissions under CAA. Furthermore, under the authority of the CAA, the EPA is beginning to regulate GHG emissions starting with large stationary sources. In 2010, the U.S. EPA set GHG thresholds to define when permits under the New Source Review Prevention of Significant Deterioration standard and Title V Operating Permit programs are required for new and existing industrial facilities. In 2012, U.S. EPA proposed a carbon pollution standard for new power plants.

Corporate Average Fuel Standards

Established by the U.S. Congress in 1975, the Corporate Average Fuel Economy (CAFE) standards reduce energy consumption by increasing the fuel economy of cars and light trucks. The National Highway Traffic Safety Administration (NHTSA) and U.S. EPA jointly administer the CAFE standards. The U.S. Congress has specified that CAFE standards must be set at the "maximum feasible level" with consideration given for: (1) technological feasibility; (2) economic practicality; (3) effect of other standards on fuel economy; and (4) need for the nation to conserve energy.

Fuel efficiency standards for medium- and heavy-duty trucks have been jointly developed by U.S. EPA and NHTSA. The Phase 1 heavy-duty truck standards apply to combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles for model years 2014 through 2018, and result in a reduction in fuel consumption from 6 to 23 percent over the 2010 baseline, depending on the vehicle type (U.S. EPA 2011). In 2012, the U.S. EPA and NHTSA also adopted the Phase 2 heavy-duty truck standards, which cover model years 2021 through 2027 and require the phase-in of a 5 to 25 percent reduction in fuel consumption over the 2017 baseline depending on the compliance year and vehicle type (U.S. EPA 2016).

State

Executive Order S-3-05 – Statewide Greenhouse Gas Emissions Targets

On June 1, 2005, the Governor issued EO S-3-05 which set the following GHG mission reduction targets:

- By 2020, reduce GHG emissions to 1990 levels
- By 2050, reduce GHG emissions to 80 percent below 1990 levels

This EO directed the secretary of the California EPA to oversee the efforts made to reach these targets, and to prepare biannual biennial reports on the progress made toward meeting the targets and on the impacts on California related to global warming. The first such Climate Action Team Assessment Report was produced in March 2006 and has been updated every two years thereafter. This goal was further reinforced with the passage of AB 32 in 2006 and SB 32 in 2016.

Executive Order S-01-07

This order, signed by Governor Schwarzenegger, sets forth the low carbon fuel standard (LCFS) for California. Under this EO, the carbon intensity of California's transportation fuels is to be reduced by at least 10 percent by the year 2020. CARB re-adopted the LCFS regulation in September 2015, and

the changes went into effect on January 1, 2016. The program establishes a strong framework to promote the low-carbon fuel adoption necessary to achieve the Governor's 2030 and 2050 GHG reduction goals.

Assembly Bill 32 – California Global Warming Solutions Act

In 2006, the California legislature passed Assembly Bill (AB) 32 (Health and Safety Code § 38500 et seq., or AB 32), also known as the Global Warming Solutions Act. AB 32 requires CARB to design and implement feasible and cost-effective emission limits, regulations, and other measures, such that statewide GHG emissions are reduced to 1990 levels by 2020 (representing a 25 percent reduction in emissions). Pursuant to AB 32, CARB adopted a Scoping Plan in December 2008, which outlines measures to meet the 2020 GHG reduction goals. California is on track to meet or exceed the target of reducing GHG emissions to 1990 levels by the end of 2020.

The Scoping Plan is required by AB 32 to be updated at least every five years. The latest update, the 2017 Scoping Plan Update, addresses the 2030 target established by Senate Bill (SB) 32 as discussed below and establishes a proposed framework of action for California to meet a 40 percent reduction in GHG emissions by 2030 compared to 1990 levels. The key programs that the Scoping Plan Update builds on include increasing the use of renewable energy in the state, the Cap-and-Trade Regulation, the Low Carbon Fuel Standard, and reduction of methane emissions from agricultural and other wastes.

Senate Bill 32 and Assembly Bill 197 of 2016

In August 2016, Governor Brown signed SB 32 and AB 197, which serve to extend California's GHG reduction programs beyond 2020. SB 32 amended the Health and Safety Code to include § 38566, which contains language to authorize CARB to achieve a statewide GHG emission reduction of at least 40 percent below 1990 levels by no later than December 31, 2030. SB 32 codified the targets established by Executive Order (EO) B-30-15 for 2030, which set the next interim step in the State's continuing efforts to pursue the long-term target expressed in EOs S-3-05 and B-30-15 of 80 percent below 1990 emissions levels by 2050.

Renewable Portfolio Standard

The RPS promotes diversification of the state's electricity supply and decreased reliance on fossil fuel energy sources. Originally adopted in 2002 with a goal to achieve a 20 percent renewable energy mix by 2020 (referred to as the "initial RPS"), the goals have been accelerated and increased by EOs S-14-08, S-21-09, SB 350, and SB 100.

The RPS is included in CARB's Scoping Plan list of GHG reduction measures to reduce energy sector emissions. It is designed to accelerate the transformation of the electricity sector through such means as investment in the energy transmission infrastructure and systems to allow integration of large quantities of intermittent wind and solar generation. Increased use of renewables would decrease California's reliance on fossil fuels, thus reducing emissions of GHGs from the electricity sector.

Senate Bill 350

The RPS program was further accelerated in 2015 with SB 350 which mandated a 50 percent RPS by 2030. SB 350 includes interim annual RPS targets with three-year compliance periods and requires 65 percent of RPS procurement to be derived from long-term contracts of 10 or more years.

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Senate Bill 100

On September 10, 2018, Governor Brown signed SB 100, establishing that 100 percent of all electricity in California must be obtained from renewable and zero-carbon energy resources by December 31, 2045. SB 100 also creates new standards for the RPS goals established by SB 350 in 2015. Specifically, the bill increases required energy from renewable sources for both investor-owned utilities and publicly-owned utilities from 50 percent to 60 percent by 2030. Incrementally, these energy providers must also have a renewable energy supply of 33 percent by 2020, 44 percent by 2024, and 52 percent by 2027. California must procure 100 percent of its energy from carbon free energy sources by the end of 2045.

Climate Change Scoping Plan

The Scoping Plan released by CARB in 2008 outlined the state's strategy to achieve the AB 32 goals. This Scoping Plan, developed by CARB in coordination with the Climate Action Team, proposed a comprehensive set of actions designed to reduce overall GHG emissions in California, improve the environment, reduce dependence on oil, diversify our energy sources, save energy, create new jobs, and enhance public health. It was adopted by CARB at its meeting in December 2008. According to the Scoping Plan, the 2020 target of 427 million MTCO₂e requires the reduction of 169 million MTCO₂e, or approximately 28.3 percent, from the state's projected 2020 BAU emissions level of 596 million MTCO₂e.

However, in August 2011, the Scoping Plan was re-approved by the Board and includes the Final Supplement to the Scoping Plan Functional Equivalent Document. This document includes expanded analysis of project alternatives as well as updates the 2020 emission projections in light of the current economic forecasts. Considering the updated 2020 BAU estimate of 507 million MTCO₂e, only a 16 percent reduction below the estimated new BAU levels would be necessary to return to 1990 levels by 2020. The 2011 Scoping Plan expands the list of nine Early Action Measures into a list of 39 Recommended Actions.

In May 2014, CARB developed; in collaboration with the Climate Action Team, the *First Update to California's Climate Change Scoping Plan* (Update), which shows that California is on track to meet the near-term 2020 GHG limit and is well positioned to maintain and continue reductions beyond 2020 as required by AB 32. In accordance with the United Nations Framework Convention on Climate Change, CARB is beginning to transition to the use of the AR4's 100-year GWPs in its climate change programs. CARB has recalculated the 1990 GHG emissions level with the AR4 GWPs to be 431 million MTCO₂e; therefore, the 2020 GHG emissions limit established in response to AB 32 is now slightly higher than the 427 million MTCO₂e in the initial Scoping Plan.

CARB adopted the latest update to the Climate Change Scoping Plan in December 2017. The 2017 Scoping Plan is guided by the EO B-30-15 GHG reduction target of 40 percent below 1990 levels by 2030. The 2017 Scoping Plan builds upon the framework established by the initial Scoping Plan and the First Update, while identifying new, technologically feasible, and cost-effective strategies to ensure that California meets its GHG reduction targets in a way that promotes and rewards innovation, continues to foster economic growth, and delivers improvements to the environment and public health, including in disadvantaged communities. The Plan includes policies to require direct GHG reductions at some of the State's largest stationary sources and mobile sources. These policies include the use of lower GHG fuels, efficiency regulations, and the Cap-and-Trade Program, which constrains and reduces emissions at covered sources (CARB 2017).

The majority of the Scoping Plan's GHG reduction strategies are directed at the two sectors with the largest GHG emissions contributions: transportation and electricity generation. The GHG reduction strategies for these sectors involve statutory mandates affecting vehicle or fuel manufacture, public transit, and public utilities. The reduction strategies employed by CARB are designed to reduce emissions from existing sources as well as future sources.

Senate Bill 97

SB 97, enacted in 2007, amends the CEQA statute to clearly establish that GHG emissions and the effects of GHG emissions are appropriate subjects for CEQA analysis. It directs Office of Planning and Research (OPR) to develop draft CEQA Guidelines "for the mitigation of GHG emissions or the effects of GHG emissions" by July 1, 2009, and directs the Resources Agency to certify and adopt the CEQA Guidelines by January 1, 2010.

On December 30, 2009, the Natural Resources Agency adopted amendments to the CEQA Guidelines in the CCR. The amendments went into effect on March 18, 2010, and are summarized below:

- Climate action plans and other GHG reduction plans can be used to determine whether a project has significant impacts, based upon its compliance with the plan.
- Local governments are encouraged to quantify the GHG emissions of proposed projects, noting that they have the freedom to select the models and methodologies that best meet their needs and circumstances. In addition, consideration of several qualitative factors may be used in the determination of significance, such as the extent to which the given project complies with state, regional, or local GHG reduction plans and policies. The Guidelines do not set or dictate specific thresholds of significance.
- When creating their own thresholds of significance, local governments may consider the thresholds of significance adopted or recommended by other public agencies, or recommended by experts.
- New amendments include guidelines for determining methods to mitigate the effects of GHG emissions in Appendix G of the CEQA Guidelines.
- The Guidelines are clear to state that "to qualify as mitigation, specific measures from an existing plan must be identified and incorporated into the project; general compliance with a plan, by itself, is not mitigation."
- The Guidelines promote the advantages of analyzing GHG impacts on an institutional, programmatic level, and, therefore, approve tiering of environmental analyses and highlights some benefits of such an approach.
- EIRs must specifically consider a project's energy use and energy efficiency potential, pursuant to Appendix F of the CEQA Guidelines.

Senate Bill 375 – Regional Emissions Targets

SB 375 requires that regions within the state which have a metropolitan planning organization (MPO) must adopt a sustainable communities' strategy as part of their RTPs. The strategy must be designed to achieve certain goals for the reduction of GHG emissions. The bill finds that "it will be necessary to achieve significant additional GHG reductions from changed land use patterns and improved transportation. Without improved land use and transportation policy, California will not be able to achieve the goals of AB 32." SB 375 provides that new CEQA provisions be enacted to encourage

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developers to submit applications and local governments to make land use decisions that will help the state achieve its goals under AB 32," and that "current planning models and analytical techniques used for making transportation infrastructure decisions and for air quality planning should be able to assess the effects of policy choices, such as residential development patterns, expanded transit service and accessibility, the walkability of communities, and the use of economic incentives and disincentives."

Regional

Southern California Association of Governments - 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy

The SCAG is the designated MPO for Los Angeles, Ventura, Orange, San Bernardino, Riverside, and Imperial Counties. CEQA requires that regional agencies like SCAG review projects and plans throughout its jurisdiction. SCAG, as the region's "Clearinghouse," collects information on projects of varying size and scope to provide a central point to monitor regional activity. SCAG has the responsibility of reviewing dozens of projects, plans, and programs every month. Projects and plans that are regionally significant must demonstrate to SCAG their consistency with a range of adopted regional plans and policies.

In September 2020, SCAG adopted the 2020-2045 RTP/SCS. The RTP/SCS includes a strong commitment to reduce emissions from transportation sources to comply with SB 375, improve public health, and meet the NAAQS as set forth by the federal CAA (see Section 3.3, Air Quality, of this EIR). The following SCAG goal is applicable to the project:

Reduce greenhouse gas emissions and improve air quality

As a solar generation facility, the proposed project would improve air quality by reducing the use of fossil fuels in energy production.

Local

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Pursuant to the requirements of SB 97, the Resources Agency adopted amendments to the CEQA Guidelines to provide regulatory guidance on the analysis and mitigation of GHG emissions in CEQA documents, while giving lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHG and climate change impacts. Formal CEQA thresholds for lead agencies must always be established through a public hearing process. Imperial County has not established formal quantitative or qualitative thresholds through a public rulemaking process, but CEQA permits the lead agency to establish a project-specific threshold of significance if backed by substantial evidence, until such time as a formal threshold is approved.

3.8.3 Impacts and Mitigation Measures

Thresholds of Significance

Based on CEQA Guidelines Appendix G, project impacts related to GHG emissions are considered significant if any of the following occur:

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

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

As discussed in Section 15064.4 of the CEQA Guidelines, the determination of the significance of GHG emissions calls for a careful judgment by the lead agency consistent with the provisions in Section 15064. A lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of GHG emissions resulting from a project. A lead agency shall have discretion to determine, in the context of a particular project, whether to:

- 1. Quantify greenhouse gas emissions resulting from a project; and/or
- 2. Rely on a qualitative analysis or performance based standards.

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

- 1. The extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting;
- 2. Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project; and
- 3. The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions. Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of GHG emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project. In determining the significance of impacts, the lead agency may consider a project's consistency with the State's long-term climate goals or strategies, provided that substantial evidence supports the agency's analysis of how those goals or strategies address the project's incremental contribution to climate change and its conclusion that the project's incremental contribution is not cumulatively considerable.

California Air Pollution Control Officers Association Significance Threshold

The ICAPCD has not adopted a GHG significance threshold. As previously described, Section 15064.7(c) of the CEQA Guidelines specifies that "[w]hen adopting or using thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies, or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence" (14 CCR 15064.7(c)). Thus, in the absence of any GHG emissions significance thresholds, project GHG emissions are compared against the GHG threshold recommended by the California Air Pollution Control Officers Association (CAPCOA), which has provided guidance for determining the significance of GHG emissions generated from land use development projects. CAPCOA considers projects that generate more than 900 metric tons of CO₂e per year to be significant. This 900 metric tons per year threshold was developed to ensure at least 90 percent of new GHG emissions would be reviewed and assessed for mitigation, thereby contributing to the statewide GHG emissions reduction goals that had been established for the year

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2030 under SB 32. Thus, both cumulatively and individually, projects that generate less than 900 metric tons CO₂e per year have a negligible contribution to overall emissions.

Methodology

The project-related direct and indirect emissions of GHGs were estimated using the similar methods for quantification of criteria air pollutants, as described in Section 3.4 Air Quality. Emissions were estimated using existing conditions, project construction and operations information, as well as a combination of emission factors from various sources. Where GHG emission quantification was required, emissions were modeled using the CalEEMod, version 2020.4.0. CalEEMod is a statewide land use emissions computer model designed to quantify potential GHG emissions associated with both construction and operations from a variety of land use projects.

Impact Analysis

Impact 3.8-1 Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

Construction and operation of the project would result in a relatively small amount of GHG emissions. The project would generate GHG emissions during construction and routine operational activities at the project site.

Construction. During construction, GHG emissions would be generated from the operation of off-road equipment, haul-truck trips, and on-road worker vehicle trips. Table 3.8-2 shows the project's construction-related GHG emissions. Consistent with SCAQMD's recommendations, project construction GHG emissions from all phases of construction activities were amortized over the expected life of the project, which is considered to be 30 years for a solar energy generation facility.

Table 3.8-2. Project Construction-Related Greenhouse Gas Emissions

Emissions Source	CO₂e (metric tons/year)
Total Project Construction (amortized over the 30-year life of the Project)	18.88
CAPCOA Significance Threshold	900
Exceed CAPCOA's Significance Threshold?	No

Source: Appendix C of this EIR

As shown in Table 3.8-2, the project would result in the generation of approximately 19 MTCO₂e annualized over the lifetime of the project. Therefore, the construction emissions are less than the CAPCOA's screening threshold of 900 MTCO₂e per year.

Operation. Once the project is constructed and operational, the proposed project would have no major stationary emission sources and would require minimal vehicular trips. The proposed project is anticipated to generate GHG emissions from area sources, energy usage and production, mobile sources, waste disposal, and water usage.

As shown in Table 3.8-3, the proposed project would reduce GHG emissions created in Imperial County by 4,319 MTCO₂e by providing a zero carbon source of electricity generation. The proposed project would not exceed CAPCOA's annual GHG emissions threshold of 900 MTCO₂e per year. Therefore, a less than significant impact would occur.

Table 3.8-3. Project Operation-Related Greenhouse Gas Emissions

	Greenhous	Greenhouse Gas Emissions (Metric Tons per Year)		
Category	CO ₂	CH₄	N ₂ O	CO ₂ e
Area Sources ¹	0.01	0.00	0.00	0.01
Energy Usage and Production ²	-4,299.50	-0.75	-0.09	-4,345.14
Mobile Sources ³	5.35	0.00	0.00	5.44
Backup Generator ⁴	0.61	0.00	0.00	0.62
Solid Waste ⁵	0.00	0.00	0.00	0.00
Water and Wastewater ⁶	0.38	0.01	0.00	0.66
Construction ⁷	18.63	0.00	0.00	18.88
Total GHG Emissions	-4,274.52	-0.73	-0.09	-4,319.54
CAPCOA Significance Threshold 9			900	
Exceed CAPCOA Significance Threshold?			No	

Notes:

- ¹ Area sources consist of GHG emissions from consumer products, architectural coatings, and landscaping equipment.
- ² Energy usage consists of GHG emissions from electricity used and generated onsite.
- ³ Mobile sources consist of GHG emissions from vehicles.
- ⁴ Backup Generator based on a 20 kW (62 Horsepower) diesel generator that has a cycling schedule of 30 minutes per week.
- ⁵ Solid Waste. Since no employees would be onsite during typical operations, no solid waste is anticipated to be generated from the project.
- ⁶ Water includes GHG emissions from electricity used for transport of water and processing of wastewater.
- ⁷ Construction emissions amortized over 30 years as recommended in the SCAQMD GHG Working Group on November 19, 2009. Source: Appendix C of this EIR

Mitigation Measure(s)

No mitigation measures are required.

Impact 3.8-2 Would the project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs?

As discussed in Impact 3.8-1, the proposed project would generate a relatively small amount of GHG emissions. The project-generated GHG emissions would not exceed the CAPCOA significance threshold, which was prepared with the purpose of complying with statewide GHG-reduction efforts. While the project would emit some GHG emissions during construction and a very small amount during operations, the contribution of renewable resource energy production to meet the goals of the Renewable Portfolio Standard (Scoping Plan Measure E-3) would result in a net cumulative reduction of GHG emissions, a key environmental benefit. Scoping Plan Measure E-3, Renewable Portfolio Standard, of the Climate Change Scoping Plan requires that all investor-owned utility companies generate 60 percent of their energy demand from renewable sources by the year 2030. Therefore, the short-term minor generation of GHG emissions during construction which is necessary to create this new, low-GHG emitting power-generating facility, as well as the negligible amount generated during ongoing maintenance operations, would be more than offset by GHG emission reductions associated with solar-generated energy during operation.

Increasing sources of solar energy is one of the measures identified under the Scoping Plan to reduce statewide GHG emissions. The proposed project would reduce GHG emissions in a manner consistent with SB 32 and other California GHG-reducing legislation by creating a new source of solar power to replace the current use of fossil-fuel power and reduce GHG emissions power generation and use. Implementation of the proposed project would result in a less than significant impact associated with

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the potential to conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emission of GHG.

Mitigation Measure(s)

No mitigation measures are required.

3.8.4 Decommissioning/Restoration and Residual Impacts

Decommissioning/Restoration

If at the end of the PPA term, no contract extension is available for a power purchaser, no other buyer of the energy emerges, or there is no further funding of the project, the project will be decommissioned and dismantled. Similar to construction activities, decommissioning and restoration would result in GHG emissions below allowable thresholds.

Residual

The proposed project's GHG emissions would result in a less than significant impact. Project operation, subject to the provision of a CUP, would generally be consistent with statewide GHG emission goals and policies including SB 32. Project consistency with applicable plans, policies, and regulations adopted to reduce GHG emissions would ensure that the project would not result in any residual significant and unavoidable impacts with regards to global climate change.

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3.9 Hazards and Hazardous Materials

Information contained in this section is summarized from review of information from Envirostor, GeoTracker, and relevant County plans to present the existing conditions, in addition to identifying potential environmental impacts. This section addresses potential hazards and hazardous materials for construction and operational impacts.

3.9.1 Existing Conditions

The project site is located in an agriculturally zoned area of Imperial County. The project site consists of agricultural fields that are currently under cultivation. The potential for an accident is increased in regions near major arterial roadways or railways that transport hazardous materials in regions with agricultural or industrial facilities that use, store, handle, or dispose of hazardous materials.

Records Review

Envirostor

The Envirostor Database from the California DTSC records was reviewed for known contamination or sites for which there may be reason to investigate further. A desktop review was completed on September 14, 2021 for the project site. Two Leaking Underground Storage Tanks (LUST) were identified within 1 mile of the project site; however, both cases have been complete and are closed. No reported cases were found on the project sites and no active sites have been identified within 1-mile of the project site.

GeoTracker

Geotracker GIS data from the SWRCB was used to review regulatory data about underground fuel tanks, fuel pipelines, and public drinking water supplies. Site information from the Spills, Leaks, Investigations, and Cleanups Program is also included in GeoTracker. A desktop review was completed on September 14, 2021 for the project site. No reported cases were found on the project site and no risk sites were located within 1 mile of the project sites.

Airports

The project site is located within 2 miles of a public airport or a public use airport. The nearest airport to the proposed project is the Brawley Municipal Airport located approximately 1.5 miles south of the project site.

Fire Hazard

The project site is located in the unincorporated area of Imperial County. According to the Seismic and Public Safety Element of the General Plan, the potential for a major fire in the unincorporated areas of the County is generally low (County of Imperial 1997a).

Battery Energy Storage System

The on-site battery energy storage system would utilize lithium-ion batteries. The batteries could contain a variety of valuable metals, and recycling of these batteries is expected to become increasingly commonplace with the increased use of batteries in consumer goods and electric

vehicles. Some batteries may have the capacity at the end of the operating life of the project to be reused.

3.9.2 Regulatory Setting

This section identifies and summarizes state and local laws, policies, and regulations that are applicable to the project.

Federal

Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act, commonly known as Superfund, was enacted by Congress on December 11, 1980. This law created a tax on the chemical and petroleum industries and provided broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. Over 5 years, \$1.6 billion was collected and the tax went to a trust fund for cleaning up abandoned or uncontrolled hazardous waste sites. The Comprehensive Environmental Response, Compensation, and Liability Act established prohibitions and requirements concerning closed and abandoned hazardous waste sites; provided for liability of persons responsible for releases of hazardous waste at these sites; and established a trust fund to provide for cleanup when no responsible party could be identified.

Emergency Planning Community Right-to-Know Act of 1986 (42 United States Code 11001 et seq.)

The Emergency Planning Community Right-to-Know Act was included under the Superfund Amendments and Reauthorization Act (SARA) law and is commonly referred to as SARA Title III. Emergency Planning Community Right-to-Know was passed in response to concerns regarding the environmental and safety hazards posed by the storage and handling of toxic chemicals. These concerns were triggered by the disaster in Bhopal, India, in which more than 2,000 people suffered death or serious injury from the accidental release of methyl isocyanate. To reduce the likelihood of such a disaster in the U.S., Congress imposed requirements on both states and regulated facilities.

Emergency Planning Community Right-to-Know establishes requirements for federal, state, and local governments, Indian Tribes, and industry regarding emergency planning and "Community Right-to-Know" reporting on hazardous and toxic chemicals. SARA Title III requires states and local emergency planning groups to develop community emergency response plans for protection from a list of Extremely Hazardous Substances (40 CFR 355). The Emergency Planning Community Right-to-Know provisions help increase the public's knowledge and access to information on chemicals at individual facilities, their uses, and releases into the environment. In California, SARA Title III is implemented through the California Accidental Release Prevention.

Federal Insecticide, Fungicide, and Rodenticide Act

The objective of Federal Insecticide, Fungicide, and Rodenticide Act is to provide federal control of pesticide distribution, sale, and use. All pesticides used in the U.S. must be registered (licensed) by the EPA. Registration assures that pesticides would be properly labeled and that, if used in accordance with specifications, they would not cause unreasonable harm to the environment. Use of each registered pesticide must be consistent with use directions contained on the label or labeling.

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Federal Water Pollution Control Act (Clean Water Act)

The objective of the Federal Water Pollution Control Act, commonly referred to as the CWA, is to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing point and nonpoint pollution sources, providing assistance to publicly owned treatment works for the improvement of wastewater treatment, and maintaining the integrity of wetlands. The oil SPCC Program of the CWA specifically seeks to prevent oil discharges from reaching waters of the U.S. or adjoining shorelines. Further, farms are subject to the SPCC rule if they:

- Store, transfer, use, or consume oil or oil products
- Could reasonably be expected to discharge oil to waters of the U.S. or adjoining shorelines.
 Farms that meet these criteria are subject to the SPCC rule if they meet at least one of the following capacity thresholds:
 - Aboveground oil storage capacity greater than 1,320 gallons
 - Completely buried oil storage capacity greater than 42,000 gallons

However, the following are exemptions to the SPCC rule:

- Completely buried storage tanks subject to all the technical requirements of the underground storage tank regulations
- Containers with a storage capacity less than 55 gallons of oil
- Wastewater treatment facilities
- Permanently closed containers
- Motive power containers (e.g., automotive or truck fuel tanks)

Hazardous Materials Transport Act – Code of Federal Regulations

The Hazardous Materials Transportation Act was published in 1975. Its primary objective is to provide adequate protection against the risks to life and property inherent in the transportation of hazardous material in commerce by improving the regulatory and enforcement authority of the Secretary of Transportation. A hazardous material, as defined by the Secretary of Transportation is, any "particular quantity or form" of a material that "may pose an unreasonable risk to health and safety or property."

Occupational Safety and Health Administration

Occupational Safety and Health Administration's (OSHA) mission is to ensure the safety and health of America's workers by setting and enforcing standards; providing training, outreach, and education; establishing partnerships; and encouraging continual improvement in workplace safety and health. OSHA standards are listed in 29 CFR Part 1910.

The OHSA Process Safety Management of Highly Hazardous Chemicals (29 CFR Part 110.119) is intended to prevent or minimize the consequences of a catastrophic release of toxic, reactive, flammable, or explosive highly hazardous chemicals by regulating their use, storage, manufacturing, and handling. The standard intends to accomplish its goal by requiring a comprehensive management program integrating technologies, procedures, and management practices.

Resource Conservation and Recovery Act

The goal of the Resource Conservation and Recovery Act, a federal statute passed in 1976, is the protection of human health and the environment, the reduction of waste, the conservation of energy and natural resources, and the elimination of the generation of hazardous waste as expeditiously as possible. The Hazardous and Solid Waste Amendments of 1984 significantly expanded the scope of RCRA by adding new corrective action requirements, land disposal restrictions, and technical requirements. The corresponding regulations in 40 CFR 260-299 provide the general framework for managing hazardous waste, including requirements for entities that generate, store, transport, treat, and dispose of hazardous waste.

State

California Department of Conservation, Division of Oil, Gas, and Geothermal Resources

The Division of Oil, Gas, and Geothermal Resources was formed in 1915 to address the needs of the state, local governments, and industry by regulating statewide oil and gas activities with uniform laws and regulations. The Division supervises the drilling, operation, maintenance, and plugging and abandonment of onshore and offshore oil, gas, and geothermal wells, preventing damage to: (1) life, health, property, and natural resources; (2) underground and surface waters suitable for irrigation or domestic use; and (3) oil, gas, and geothermal reservoirs. The Division's programs include: well permitting and testing; safety inspections; oversight of production and injection projects; environmental lease inspections; idle-well testing; inspecting oilfield tanks, pipelines, and sumps; hazardous and orphan well plugging and abandonment contracts; and subsidence monitoring.

California Department of Toxic Substances Control

DTSC regulates hazardous waste, cleans-up existing contamination, and looks for ways to reduce the hazardous waste produced in California. Approximately 1,000 scientists, engineers, and specialized support staff are responsible for ensuring that companies and individuals handle, transport, store, treat, dispose of, and clean-up hazardous wastes appropriately. Through these measures, DTSC contributes to greater safety for all Californians, and less hazardous waste reaches the environment.

On January 1, 2003, the Registered Environmental Assessor program joined DTSC. The program certifies environmental experts and specialists as being qualified to perform a number of environmental assessment activities. Those activities include private site management, Phase I ESAs, risk assessment, and more.

California Division of Occupational Safety and Health

The California Division of Occupational Safety and Health protects workers and the public from safety hazards through its programs and provides consultative assistance to employers. California Division of Occupational Safety and Health issues permits, provides employee training workshops, conducts inspections of facilities, investigates health and safety complaints, and develops and enforces employer health and safety policies and procedures.

California Environmental Protection Agency

California Environmental Protection Agency and the SWRCB establish rules governing the use of hazardous materials and the management of hazardous waste. Applicable state and local laws include the following:

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- Public Safety/Fire Regulations/Building Codes
- Hazardous Waste Control Law
- Hazardous Substances Information and Training Act
- Air Toxics Hot Spots and Emissions Inventory Law
- Underground Storage of Hazardous Substances Act
- Porter-Cologne Water Quality Control Act

Within Cal-EPA, DTSC has primary regulatory responsibility, with delegation of enforcement to local jurisdictions that enter into agreements with the state agency, for the management of hazardous materials and the generation, transport, and disposal of hazardous waste under the authority of the Hazardous Waste Control Law.

California Emergency Response Plan

California has developed an Emergency Response Plan to coordinate emergency services provided by federal, state, and local government and private agencies. Response to hazardous materials incidents is one part of this plan. The plan is managed by the State Office of Emergency Services (OES), which coordinates the responses of other agencies including Cal-EPA, the California Highway Patrol, CDFW, RWQCB, Imperial County Sheriff's Department, ICFD, and the City of Imperial Police Department.

Local

Imperial County General Plan

The Seismic and Public Safety Element identifies goals and policies that will minimize the risks associated with natural and human-made hazards, and specify the land use planning procedures that should be implemented to avoid hazardous situations. The purpose of the Seismic and Public Safety Element is to reduce the loss of life, injury, and property damage that might result from disaster or accident. In addition, the Element specifies land use planning procedures that should be implemented to avoid hazardous situations. The policies listed in the Seismic and Public Safety Element are not applicable to the proposed project, as they address human occupancy development. The proposed project is a solar project and does not propose residential uses.

Imperial County Public Health Department

DTSC was appointed the Certified Unified Program Agency (CUPA) for Imperial County in January 2005. The Unified Program is the consolidation of 6 state environmental programs into one program under the authority of a CUPA. The CUPA inspects businesses or facilities that handle or store hazardous materials, generate hazardous waste, own or operate ASTs or USTs, and comply with the California Accidental Release Prevention Program. The CUPA Program is instrumental in accomplishing this goal through education, community and industry outreach, inspections and enforcement.

Office of Emergency Services

As part of the ICFD, the County OES is mandated by the California Emergency Services Act (Chapter 7, Division 1, Title 2 of Government Code) to serve as the liaison between the State and all the local

government in the County. The OES provides centralized emergency management during major disasters, and coordinates emergency operations between various local jurisdictions within the County. The OES has developed several plans, consistent with federal and state policy guidance, to provide the County and participating local jurisdictions and agencies a framework for conducting emergency planning, response, and recovery operations, and handling of hazardous substances.

3.9.3 Impacts and Mitigation Measures

This section presents the significance criteria used for considering project impacts related to land use and planning, the methodology employed for the evaluation, an impact evaluation, and mitigation requirements, if necessary.

Thresholds of Significance

Based on CEQA Guidelines Appendix G, project impacts related to hazards and hazardous materials are considered significant if any of the following occur:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials
- 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
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school
- 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 create a significant hazard to the public or the environment
- For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, result in a safety hazard or excessive noise for people residing or working in the project area
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan
- Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires

Methodology

This analysis evaluates the potential for the project, as described in Chapter 2, Project Description to result in significant impacts related to hazards and hazardous materials on or within the 1-mile buffer zone of the project site. This analysis considers whether these conditions would result in an exceedance of one or more of the applied significance criteria as identified above.

Information from Envirostor and GeoTracker were reviewed to present the existing conditions, in addition to identifying potential environmental impacts, based on the significance criteria presented above. Impacts associated with hazards and hazardous materials that could result from project construction and operational activities were evaluated qualitatively based on site conditions; expected

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construction practices; materials, locations, duration of project construction, and related activities. The conceptual site plan for the project was also used to evaluate potential impacts.

Impact Analysis

Impact 3.9-1 Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Although considered minimal, it is anticipated that the project will generate the following materials during construction, operation, and long-term maintenance: insulating oil (used for electrical equipment), lubricating oil (used for maintenance vehicles), various solvents/detergents (equipment cleaning), and gasoline (used for maintenance vehicles). These materials have the potential to be released into the environment as a result of natural hazard (i.e., earthquake) related events, or because of human error. However, all materials contained on site will be stored in appropriate containers (not to exceed a 55-gallon drum) protected from environmental conditions, including rain, wind, and direct heat and physical hazards such as vehicle traffic and sources of heat and impact. In addition, if the on-site storage of hazardous materials necessitate, at any time during construction and/or operations and long-term maintenance, quantities in excess of 55-gallons, a hazardous material management program (HMMP) would be required. The HMMP developed for the project will include, at a minimum, procedures for:

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

Additionally, hazardous material storage and management will be conducted in accordance with requirements set forth by the ICFD, Imperial County OES, DTSC, and CUPA for storage and handling of hazardous materials. Further, construction activities would occur according to OSHA regulatory requirements; therefore, it is not anticipated that the construction activities for the proposed project would release hazardous emissions or result in the handling of hazardous or acutely hazardous materials, substances, or waste. This could include the release of hazardous emissions, materials, substances, or wastes during operational activities. With the implementation of an HMMP and adherence to requirements set forth by the ICFD, Imperial County OES, DTSC, OSHA regulatory requirements and CUPA would reduce the impact to a level of less than significant.

Battery Energy Storage System

In conjunction with the construction of the solar facility, a battery energy storage system will be constructed to store the energy generated by the solar panels. Transportation of hazardous materials relating to the battery system includes electrolyte and graphite and would occur during construction, operation (if replacement of batteries is needed) and decommissioning (removal of the batteries). All of these various materials would be transported and handled in compliance with DTSC regulations. Therefore, likelihood of an accidental release during transport or residual contamination following accidental release is not anticipated.

Lithium-ion batteries used in the storage system contain cobalt oxide, manganese dioxide, nickel oxide, carbon, electrolyte, and polyvinylidene fluoride. Of these chemicals, only electrolyte should be considered hazardous, inflammable and could react dangerously when mixed with water. The U.S. Department of Transportation (DOT) regulates transport of lithium-ion batteries under the DOT's Hazardous Materials Regulations (HMR; 49 C.F.R., Parts 171-180). The HMR apply to any material DOT determines is capable of posing an unreasonable risk to health, safety, and property when transported in commerce. Lithium-ion batteries must conform to all applicable HMR requirements when offered for transportation or transported by air, highway, rail, or water (DOT 2021). Additionally, carbon (as graphite) is flammable and could pose a fire hazard. As further detailed below, fire protection is achieved through project design features, such as monitoring, diagnostics and a fire suppression system. The project would be required to comply with state laws and county ordinance restrictions, which regulate and control hazardous materials handled on site.

Construction wastes would be disposed of in accordance with local, state, and federal regulations, and recycling will be used to the greatest extent possible. In this context, with adherence to requirements set forth by the ICFD, Imperial County OES, DTSC, OSHA regulatory requirements and CUPA, impacts would be less than significant.

Mitigation Measure(s)

No mitigation measures are required.

Impact 3.9-2 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?

Hazardous Materials

The project site is currently being used for agricultural production. Typical agricultural practices in the Imperial Valley consist of aerial and ground application of pesticides and the application of chemical fertilizers to both ground and irrigation water. However, the Federal Insecticide, Fungicide, and Rodenticide Act provides federal control of pesticide distribution, sale, and use. Pesticides used in the United States must be registered by the EPA to assure that pesticides are properly labeled and that they will not cause unreasonable harm to the environment. The construction phase, operations and long-term maintenance of the facility would not result in additional application of pesticides or fertilizers.

As stated above, construction of the proposed project will involve the use of limited use of hazardous materials, such as fuels and greases to fuel and service construction equipment, and during operation regular and routine maintenance of the proposed project may result in the potential to handle hazardous materials. However, the hazardous materials handled on-site would be limited to small amounts of everyday use cleaners and common chemicals used for maintenance. The applicant will be required to comply with State laws and County Ordinance restrictions, which regulate and control hazardous materials handled on-site. Therefore, a less than significant impact has been identified for this issue area.

Review of information from Envirostor and GeoTracker, the project site is not listed as a hazardous materials site and there are no active sites that require cleanup, such as LUST Sites, Department of

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Defense Sites, and Cleanup Program Sites within 1 mile of the project site. The two LUST cases within 1 mile of the project site are completed and closed.

Battery Energy Storage System

Protection would be provided as part of the project design by housing the battery units in enclosed structures to provide containment should a fire break out or for potential spills. Any potential fire risk that the traditional lithium-ion cells have will most likely be caused by over-charging or through short circuit due to age. This risk will be mitigated through monitoring and a fire suppression system that includes water and or a suppression agent (eg FM-200, Novatech) with smoke detectors, control panel, alarm, piping and nozzles. The fire protection system will be designed by a certified fire protection engineer and installed by a fire protection system contractor licensed in California and in accordance with all relevant building and fire codes in effect in the County at the time of building permit submission. Fire protection systems for battery systems would be designed in accordance with California Fire Code and would take into consideration the recommendations of the National Fire Protection Association (NFPA) 855.

The fire protection plan is anticipated to include a combination of prevention, suppression, and isolation methods and materials. The general approach to fire mitigation at the project site would be prevention of an incident, followed by attempts to isolate and control the incident to the immediately affected equipment, then to suppress any fire with a clean agent so as to reduce damage to uninvolved equipment. Fire suppression agents such as Novec 1230 or FM 2000, or water may be used as a suppressant. In addition, fire prevention methods would be implemented to reduce potential fire risk, including voltage, current, and temperature alarms. Energy storage equipment would comply with Underwriters Laboratory (UL)-95401 and test methods associated with UL-9540A. For lithium-ion batteries storage, a system would be used that would contain the fire event and encourage suppression through cooling, isolation, and containment. Suppressing a lithium-ion (secondary) battery is best accomplished by cooling the burning material. A gaseous fire suppressant agent (e.g., 3M™ Novec™ 1230 Fire Protection Fluid or similar) and an automatic fire extinguishing system with sound and light alarms would be used for lithium-ion batteries.

To mitigate potential hazards, redundant separate methods of failure detection would be implemented. These would include alarms from the Battery Management System (BMS), including voltage, current, and temperature alarms. Detection methods for off gas detection would be implemented, as applicable. These are in addition to other potential protective measures such as ventilation, overcurrent protection, battery controls maintaining batteries within designated parameters, temperature and humidity controls, smoke detection, and maintenance in accordance with manufacturer guidelines. Remote alarms would be installed for operations personnel as well as emergency response teams in addition to exterior hazard lighting. In addition, an Incidence Response Plan would be implemented. In this context, impacts would be considered less than significant for this impact area.

Mitigation Measure(s)

No mitigation measures are required.

Impact 3.9-3 Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school?

The project site is not located within 0.25 mile of an existing or proposed school. Therefore, the proposed project would not pose a risk to nearby schools and no impact would occur.

Mitigation Measure(s)

No mitigation measures are required.

Impact 3.9-4 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 create a significant hazard to the public or the environment?

Based on a review of the Cortese List conducted in September 2021, the project site is not listed as a hazardous materials site. Therefore, implementation of the proposed project would result in no impact related to the project site being located on a listed hazardous materials site pursuant to Government Code Section 65962.5.

Mitigation Measure(s)

No mitigation measures are required.

Impact 3.9-5 For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, result in a safety hazard or excessive noise for people residing or working in the project area?

The nearest public airport is the Brawley Municipal Airport located approximately 1.5 miles south of the project site. However, the project site is outside of the airport compatibility zones of the Brawley Municipal Airport (County of Imperial 1996). Additionally, as discussed in Section 3.2, Aesthetics, the project would not expose approach slopes associated with the Brawley Municipal Airport to glare hazards. Furthermore, on May 18, 2022, the Imperial County Airport Land Use Commission determined that the proposed project is compatible with the ALUCP. Therefore, implementation of the proposed project would not result in a safety hazard or excessive noise for people residing or working in the project area and no impact would occur. No significant impact is identified for this issue area.

Mitigation Measure(s)

No mitigation measures are required.

Impact 3.9-6 Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

The Imperial County Operational Area Emergency Operations Plan (Imperial County OES 2016) does not identify specific emergency roadway routes as part of their emergency operations plan (EOP). The Circulation & Scenic Highways Element of the General Plan (County of Imperial 2008), identifies SR-

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111, located west of the project site, as the "backbone" route of Imperial County since it connects the three largest cities and acts as a major goods movement route.

The applicant for the proposed project will be required, through the Conditions of Approval, to prepare a street improvement plan for the proposed project that will include emergency access points and safe vehicular travel. Additionally, local building codes would be followed to minimize flood, seismic, and fire hazard. Therefore, the proposed project would result in a less than significant impact associated with the possible impediment to emergency response plans or emergency evacuation plans.

Mitigation Measure(s)

No mitigation measures are required.

Impact 3.9-7 Would the project expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?

The project site is located in the unincorporated area of Imperial County. According to the Seismic and Public Safety Element of the General Plan (County of Imperial 1997), the potential for a major fire in the unincorporated areas of the County is generally low.

Proposed project facilities would be designed, constructed, and operated in accordance with applicable fire protection and other environmental, health, and safety requirements (e.g., CPUC safety standards). Primary access to the project site would be located off N Best Avenue. A secondary emergency access road would be located in the northwest portion of the project site. Access roads would also be constructed with an all-weather surface, to meet the County Fire Department's standards. Points of ingress/egress would be accessed via locked gates that can be opened by any emergency responders. Additionally, water for emergency fire suppression would likely be provided by water trucks during construction and the existing ground storage tank on-site which is filled by the Best Canal during operation.

Because the proposed project is not located in proximity to an area susceptible to wildland fires, implementation of the proposed project would result in a less than significant impact related to the possible risk to people or structures caused by wildland fires.

Mitigation Measure(s)

No mitigation measures are required.

3.9.4 Decommissioning/Restoration and Residual Impacts

Decommissioning/Restoration

If at the end of the PPA term, no contract extension is available for a power purchaser, no other buyer of the energy emerges, or there is no further funding of the project, the project will be decommissioned and dismantled. During decommissioning and restoration of the project site, the applicant or its successor in interest would be responsible for the removal, recycling, and/or disposal of all solar arrays, inverters, battery storage system, transformers and other structures on each of the project site. The project applicant anticipates using the best available recycling measures at the time of decommissioning. Any potentially hazardous materials located on the site would be disposed of, and/or remediated prior to construction of the solar facilities. At the end of a lithium-ion module's useful life (typically estimated to be 10 to 20+ years) and final project decommissioning, the batteries would

be decommissioned and recycled per manufacturer guidelines. Certain manufacturers allow for the batteries to be returned to the manufacturing facility or a third-party recycling facility where the batteries are disassembled, and certain materials are recovered from the battery for reuse.

The operation of the solar facility would not generate hazardous wastes and therefore, implementation of applicable regulations and mitigation measures identified for construction and operations would ensure restoration of the project site to pre-project conditions during the decommissioning process in a manner that would be less than significant. Furthermore, decommissioning/restoration activities would not result in a potential impact associated with ALUCP consistency (structures would be removed and the site would remain in an undeveloped condition), wildfires (fire protection measures), or impediment to an emergency plan (the undeveloped condition as restored, would not conflict with emergency plans).

Residual

Adherence to federal, state and local regulations will ensure that impacts related to the transportation of hazardous materials and potential fires would be reduced to levels less than significant. Based on these circumstances, the proposed project would not result in residual significant and unmitigable impacts related to hazards and hazardous materials.

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3.10 Hydrology/Water Quality

This section provides a description of existing water resources within the project area and pertinent local, state, and federal plans and policies. Each subsection includes descriptions of existing hydrology/drainage, existing flooding hazards, and the environmental impacts on hydrology and water quality resulting from implementation of the proposed project, and mitigation measures where appropriate. The impact assessment provides an evaluation of potential adverse effects to water quality based on criteria derived from CEQA Guidelines in conjunction with actions proposed in Chapter 2, Project Description.

3.10.1 Existing Conditions

The project site is located in the Imperial Valley Planning Area of the Colorado River Basin. The Colorado River Basin Region covers approximately 13 million acres (20,000 square miles) in the southeastern portion of California. It includes all of Imperial County and portions of San Bernardino, Riverside, and San Diego Counties. The Colorado River Basin Region is divided into seven major planning areas on the basis of different economic and hydrologic characteristics (California RWQCB 2019). The project site is contained within the Brawley Hydrologic Area in the Imperial Hydrologic Unit (HU 723.10). The Imperial Valley is characterized as a closed basin and, therefore, all runoff generated within the watershed discharges into the Salton Sea (California RWQCB 2019). The western portion of the project site is located within the New River watershed (Hydrologic Unit Code [HUC-10] 1810020411); the eastern portion of the project site is located within the Alamo River watershed (HUC-10 1810020408) (Appendix D of this EIR).

The project area is characterized by a typical desert climate with dry, warm winters, and hot, dry summers. Most of the rainfall occurs in conjunction with monsoonal conditions between May and September, with an average annual rainfall of 3.15 inches for the project area (City of Brawley 2020).

Localized Drainage Conditions

The project site and the surrounding terrain is generally flat. The New River flows through the middle portion of the project site. In addition, several drains, and ditches owned by Imperial Irrigation District (IID) flow along the borders of the project site (Appendix D of this EIR).

Flooding

According to the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map (FIRM) (Map Number 06025C1025C) (FEMA 2008), the proposed project site is located in Zone X (unshaded). The FEMA Zone X (unshaded) designation is an area determined to be outside the 0.2 percent annual chance floodplain. However, the project site is bounded to the west by the New River, which is within the 100-year floodplain, and subject to a 1 percent chance of annual flood risk (FEMA 2008).

Surface Water Quality

The surface waters of the Imperial Valley depend primarily on the inflow of irrigation water from the Colorado River via the All-American Canal. Excessive salinity concentrations have long been one of the major water quality problems of the Colorado River, a municipal and industrial water source to

millions of people, and a source of irrigation water for approximately 700,000 acres of farmland. The heavy salt load in the Colorado River results from both natural and human activities. Land use and water resources are unequivocally linked. A variety of natural and human factors can affect the quality and use of streams, lakes, and rivers. Surface waters may be impacted from a variety of point and non-point discharges. Examples of point sources may include wastewater treatment plants, industrial discharges, or any other type of discharge from a specific location (commonly a large-diameter pipe) into a stream or water body. In contrast, non-point source pollutant sources are generally more diffuse in nature and connected to a cumulative contribution of multiple smaller sources. There are no comprehensive water quality monitoring stations located within in the project site, and water quality data are limited.

Common non-point source contaminants within the project area may include, but are not limited to: sediment, nutrients (phosphorous and nitrogen), trace metals (e.g., lead, zinc, copper, nickel, iron, cadmium, and mercury), oil and grease, bacteria (e.g., coliform), viruses, pesticides and herbicides, organic matter, and solid debris/litter. Vehicles account for most of the heavy metals, fuel and fuel additives (e.g., benzene), motor oil, lubricants, coolants, rubber, battery acid, and other substances. Nutrients result from excessive fertilizing of agricultural areas, while pesticides and herbicides are widely used in agricultural fields and roadway shoulders for keeping right-of-way (ROW) areas clear of vegetation and pests. Surface waters mostly drain towards the Salton Sea. The New and Alamo Rivers convey agricultural irrigation drainage, surface runoff, and some treated municipal waste from the Imperial Valley. The flow in the New River also contains agricultural drainage, treated and untreated sewage, and industrial waste discharges from Mexicali, Mexico (California RWQCB 2019).

Based on the 2018 305(b)/303(d) Integrated Report prepared by the Colorado River Basin RWQCB, the water features within the Brawley Hydrologic Area include the Imperial Valley Drains, New River, and the Salton Sea (California RWQCB 2021). Specific impairments listed for each of these water bodies (or Category 5) are identified below:

- Imperial Valley Drains: Impaired for chlordane, dichlorodiphenyltrichloroethane (DDT), dieldrin, imidacloprid, Polychlorinated biphenyls (PCBs), chlorpyrifos, sedimentation/siltation, toxicity, toxaphene, and selenium;
- New River: Impaired for Hexachlorobenzene, mercury, nutrients, selenium, toxicity, indicator bacteria, organic enrichment/low dissolved oxygen, sediment, trash, toxaphene, chlordane, chlorpyrifos, DDT, diazinon, cyhalothrin, lambda, malathion, dieldrin, PCBs, bifenthrin, chloride, cypermethrin, naphthalene, nitrogen ammonia, disulfoton, imidacloprid, and ichlorodiphenyldichloroethan (DDD);
- Salton Sea: Impaired for arsenic, chlorpyrifos, DDT, enterococcus, low dissolved oxygen, nutrients, salinity, toxicity, chloride, and ammonia (California RWQCB 2021).

Groundwater Hydrology

The project site is located in the Imperial Valley Groundwater Basin (Basin 7-030). The basin covers 957,774 acres. Adjacent basins include East Salton Sea to the north, Amos Valley to the northeast, Ogilby Valley to the southeast, Coyote Wells Valley to the southwest, and Ocotillo-Clark Valley to the northwest (Groundwater Exchange 2021; California Department of Water Resources 2021).

Groundwater quality in the Imperial Valley Basin is generally reported as poor and not suitable for domestic or municipal purposes (United States Geological Survey 2014).

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3.10.2 Regulatory Setting

Federal

Clean Water Act

The U.S. EPA is the lead federal agency responsible for managing water quality. The CWA of 1972 is the primary federal law that governs and authorizes the U.S. EPA and the states to implement activities to control water quality. The various elements of the CWA that address water quality and that are applicable to the project are discussed below. Wetland protection elements administered by the USACE under Section 404 of the CWA, including permits for the discharge of dredged and/or fill material into waters of the United States, are discussed in Section 3.5, Biological Resources.

Under federal law, the U.S. EPA has published water quality regulations under Volume 40 of the CFR. Section 303 of the CWA requires states to adopt water quality standards for all surface waters of the U.S. As defined by the CWA, water quality standards consist of two elements: (1) designated beneficial uses of the water body in question; and (2) criteria that protect the designated uses. Section 304(a) requires the U.S.EPA to publish advisory water quality criteria that accurately reflect the latest scientific knowledge on the kind and extent of all effects on health and welfare that may be expected from the presence of pollutants in water. Where multiple uses exist, water quality standards must protect the most sensitive use. The U.S. EPA is the federal agency with primary authority for implementing regulations adopted under the CWA. The U.S.EPA has delegated the State of California the authority to implement and oversee most of the programs authorized or adopted for CWA compliance through the Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne Act), described below.

Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the U.S. must obtain a water quality certification from the SWRCB in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate.

CWA Section 402 establishes the National Pollution Discharge Elimination System (NPDES) permit program to control point source discharges from industrial, municipal, and other facilities if their discharges go directly to surface waters. The 1987 amendments to the CWA created a new section of the CWA devoted to regulating storm water or nonpoint source discharges (Section 402[p]). The U.S.EPA has granted California primacy in administering and enforcing the provisions of the CWA and the NPDES program through the SWRCB. The SWRCB is responsible for issuing both general and individual permits for discharges from certain activities. At the local and regional levels, general and individual permits are administered by RWQCBs.

Clean Water Act Section 303(d) Impaired Waters List

CWA Section 303(d) requires states to develop lists of water bodies that will not attain water quality standards after implementation of minimum required levels of treatment by point-source dischargers. Section 303(d) requires states to develop a total maximum daily load (TMDL) for each of the listed pollutants and water bodies. A TMDL is the amount of loading that the water body can receive and still be in compliance with applicable water quality objectives and applied beneficial uses. TMDLs can also act as a planning framework for reducing loadings of a specific pollutant from various sources to achieve compliance with water quality objectives. TMDLs prepared by the state must

include an allocation of allowable loadings to point and nonpoint sources, with consideration of background loadings and a margin of safety. The TMDL must also include an analysis that shows links between loading reductions and the attainment of water quality objectives.

National Flood Insurance Program

The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP) to provide subsidized flood insurance to communities that comply with FEMA regulations that limit development in floodplains. FEMA also issues Flood Insurance Rate Maps (FIRM) that identify which land areas are subject to flooding. These maps provide flood information and identify flood hazard zones in the community. The design standard for flood protection covered by the FIRM is established by FEMA, with the minimum level of flood protection for new development determined to be the 1-in-100 (0.01) annual exceedance probability) (i.e., the 100-year flood event).

State

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act, also known as the California Water Code, is California's statutory authority for the protection of water quality. Under this act, the state must adopt water quality policies, plans, and objectives that protect the state's waters. The act sets forth the obligations of the State Water Resources Control Board (SWRCB) and RWQCBs pertaining to the adoption of Water Quality Control Plans and establishment of water quality objectives. Unlike the CWA, which regulates only surface water, the Porter-Cologne Act regulates both surface water and groundwater.

Water Quality Control Plan for the Colorado River Basin

The Water Quality Control Plan for the Colorado River Basin (or Basin Plan) prepared by the Colorado River RWQCB (Region 7) identifies beneficial uses of surface waters within the Colorado River Basin region, establishes quantitative and qualitative water quality objectives for protection of beneficial uses, and establishes policies to guide the implementation of these water quality objectives.

Water bodies that have beneficial uses that may be affected by construction activity and post-construction activity include the Imperial Valley Drains (includes the Wistaria Drain and Greeson Wash), New River, and the Salton Sea. Table 3.10-1 identifies the designated beneficial uses established for the project site's receiving waters. The following are definitions of the applicable beneficial uses:

- Aquaculture (AQUA) Uses of water for aquaculture or mariculture operations including, but not limited to, propagation, cultivation, maintenance, or harvesting of aquatic plants and animals for human consumption or bait purposes.
- Freshwater Replenishment (FRSH) Uses of water for natural or artificial maintenance of surface water quantity or quality.
- Industrial Service Supply (IND) Uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, and oil well repressurization.

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- Water Contact Recreation (REC I) Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, and use of natural hot springs.
- Non-contact Water Recreation (REC II) Uses of water for recreational activities involving
 proximity to water, but not normally involving contact with water where ingestion of water is
 reasonably possible. These uses include, but are not limited to, picnicking, sunbathing,
 hiking, beachcombing, camping, boating, tide pool and marine life study, hunting,
 sightseeing, or aesthetic enjoyment in conjunction with the above activities.
- Warm Freshwater Habitat (WARM) Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
- Wildlife Habitat (WILD) Uses of water that support terrestrial ecosystems including, but not limited to, the preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.
- Preservation of Rare, Threatened, or Endangered Species (RARE) Uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened or endangered.

Table 3.10-1. Beneficial Uses of Receiving Waters

Beneficial Uses	Imperial Valley Drains	New River	Salton Sea
AQUA			X
FRSH	Х	Х	
IND		Р	Р
REC I	Х	Х	Х
REC II	Х	Х	Х
WARM	Х	Х	Х
WILD	Х	Х	Х
RARE	Х	Х	Х

Source: SWRCB 2021

AQUA=aquaculture; FRSH=freshwater replenishment; IND=industrial service supply; P=Potential Uses; RARE=Preservation of Rare, Threatened, or Endangered Species; REC 1= water contact recreation; REC II=non-contact water recreation; WARM=Warm Freshwater Habitat; WILD=Wildlife Habitat; X=existing beneficial uses

National Pollution Discharge Elimination System General Industrial and Construction Permits

The NPDES General Industrial Permit requirements apply to the discharge of stormwater associated with industrial sites. The permit requires implementation of management measures that will achieve the performance standard of the best available technology economically achievable and best conventional pollutant control technology. Under the statute, operators of new facilities must

implement industrial BMPs in the projects' SWPPP and perform monitoring of stormwater discharges and unauthorized non–stormwater discharges.

Construction activities are regulated under the NPDES General Permit for Discharges of Storm Water Runoff Associated with Construction Activity (General Construction Permit) which covers stormwater runoff requirements for projects where the total amount of ground disturbance during construction exceeds 1 acre. Coverage under a General Construction Permit requires the preparation of a SWPPP and submittal of a Notice of Intent (NOI) to comply with the General Construction Permit. The SWPPP includes a description of BMPs to minimize the discharge of pollutants from the sites during construction. Typical BMPs include temporary soil stabilization measures (e.g., mulching and seeding), storing materials and equipment to ensure that spills or leaks cannot enter the storm drain system or stormwater, and using filtering mechanisms at drop inlets to prevent contaminants from entering storm drains. Typical post-construction management practices include street sweeping and cleaning stormwater drain inlet structures. The NOI includes site-specific information and the certification of compliance with the terms of the General Construction Permit.

Local

County of Imperial General Plan

The Water Element and the Conservation and Open Space Element of the General Plan contain policies and programs, created to ensure water resources are preserved and protected. Table 3.10-2 identifies the General Plan policies and programs for water quality and flood hazards that are relevant to the project and summarizes the project's consistency with the General Plan. While this EIR analyzes the project's consistency with the General Plan pursuant to CEQA Guidelines Section 15125(d), the Imperial County Board of Supervisors ultimately determines consistency with the General Plan.

Table 3.10-2. Project Consistency with Applicable General Plan Policies

General Plan Policies	Consistency with General Plan	Analysis
Conservation and Open Space Element		
Goal 6: The County will conserve, protect, and enhance water resources in the County.	Consistent	The proposed project would protect water quality during construction through compliance with Imperial County design and detention requirements and the NPDES General Construction Permit, as well as preparation and implementation of project-specific SWPPP, which will incorporate the requirements referenced in the State Regulatory Framework, design features, and BMPs.

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Table 3.10-2. Project Consistency with Applicable General Plan Policies

General Plan Policies	Consistency with General Plan	Analysis
Objective 6.3: Protect and improve water quality and quantity for all water bodies in Imperial County.	Consistent	The proposed project would protect water quality during construction through compliance with the NPDES General Construction Permit, SWPPP, and BMPs. Implementation of Mitigation Measure HYD-2 would require the project to incorporate post-construction BMPs into the project's drainage plan. The proposed project will be designed to include site design, source control, and treatment control BMPs. The use of source control, site design, and treatment BMPs would result in a decrease potential for storm water pollution.
Program: Structural development normally shall be prohibited in the designated floodways. Only structures which comply with specific development standards should be permitted in the floodplain.	Consistent	The project does not contain a residential component nor would it place housing or other structures within a 100-year flood hazard area.
Water Element		
Policy: Adoption and implementation of ordinances, policies, and guidelines which assure the safety of County ground and surface waters from toxic or hazardous materials and/or wastes.	Consistent	The project would preserve ground and surface water quality from hazardous materials and wastes during construction, operation and decommissioning activities. The proposed project would protect water quality during construction through compliance with NPDES General Construction Permit, SWPPP, which will incorporate the requirements referenced in the State Regulatory Framework and BMPs. Implementation of Mitigation Measure HYD-2 would require the project to incorporate post-construction BMPs into the project's drainage plan. The proposed project will be designed to include site design, source control, and treatment control BMPs. The use of source control, site design, and treatment BMPs would result in a decrease potential for storm water pollution. It is anticipated that project decommissioning activities would be subject to similar, or more stringent ground and surface water regulations than those currently required.
Program: The County of Imperial shall make every reasonable effort to limit or preclude the contamination or degradation of all groundwater and surface water resources in the County.	Consistent	Mitigation measures will require that the applicant of the project prepare a site-specific drainage plan and water quality management plan to minimize adverse effects to local water resources.
Program: All development proposals brought before the County of Imperial shall be reviewed for potential adverse effects on water quality and quantity and shall be required to implement appropriate mitigation measures for any significant impacts.	Consistent	See response for Water Element Policy above.

Table 3.10-2. Project Consistency with Applicable General Plan Policies

	Consistency with General	
General Plan Policies	Plan	Analysis

Source: County of Imperial 2016; County of Imperial 1997b

County of Imperial Land Use Ordinance, Title 9

The County's Ordinance Code provides specific direction for the protection of water resources. Applicable ordinance requirements are contained in Division 10, Building, Sewer and Grading Regulations, and summarized below.

Chapter 10 – Grading Regulations. Section 91010.02 of the Ordinance Code outlines conditions required for issuance of a Grading Permit. These specific conditions include:

- 1. If the proposed grading, excavation or earthwork construction is of irrigatable land, said grading will not cause said land to be unfit for agricultural use.
- 2. The depth of the grading, excavation or earthwork construction will not preclude the use of drain tiles in irrigated lands.
- 3. The grading, excavation or earthwork construction will not extend below the water table of the immediate area.
- 4. Where the transition between the grading plane and adjacent ground has a slope less than the ratio of 1.5 feet on the horizontal plane to 1 foot on the vertical plane, the plans and specifications will provide for adequate safety precautions.

Imperial County Engineering Design Guidelines Manual for the Preparation and Checking of Street Improvement, Drainage and Grading Plans within Imperial County

Based on the guidance contained in the County's Engineering Guidelines Design Guidelines Manual for the Preparation and Checking of Street Improvement, Drainage and Grading Plans within Imperial County (2008), the following drainage requirements would be applicable to the project.

III A. GENERAL REQUIREMENTS

- 1. All drainage design and requirements are recommended to be in accordance with the IID "Draft" Hydrology Manual or other recognized source with approval by the County Engineer and based on full development of upstream tributary basins. Another source is the Caltrans I-D-F curves for the Imperial Valley.
- 3. Permanent drainage facilities and ROW, including access, shall be provided from development to point of satisfactory disposal.
- 4. Retention volume on retention or detention basins should have a total volume capacity for a three (3) inch minimum precipitation covering the entire site with no C reduction factors. Volume can be considered by a combination of basin size and volume considered within parking and/or landscaping areas.

There is no guarantee that a detention basin outletting to an IID facility or other storm drain system will not back up should the facility be full and unable to accept the project runoff. This

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- provides the safety factor from flooding by ensuring each development can handle a minimum 3-inch precipitation over the project site.
- 8. The developer shall submit a drainage study and specifications for improvements of all drainage easements, culverts, drainage structures, and drainage channels to the Department of Public Works for approval. Unless specifically waived herein, required plans and specifications shall provide a drainage system capable of handling and disposing of all surface waters originating within the subdivision and all surface waters that may flow onto the subdivision from adjacent lands. Said drainage system shall include any easements and structures required by the Department of Public Works or the affected Utility Agency to properly handle the drainage on-site and off-site. The report should detail any vegetation and trash/debris removal, as well as address any standing water.
- Hydrology and hydraulic calculations for determining the storm system design shall be provided to the satisfaction of the Director, Department of Public Works. When appropriate, water surface profiles and adequate field survey cross-section data may also be required.
- 11. The County is implementing a storm water quality program as required by the SWRCB, which may modify or add to the requirements and guidelines presented elsewhere in this document. This can include ongoing monitoring of water quality of storm drain runoff, implementation of BMPs to reduce storm water quality impacts downstream or along adjacent properties. Attention is directed to the need to reduce any potential of vectors, mosquitoes, or standing water.
- 12. A Drainage Report is required for all developments in the County. It shall include a project description, project setting including discussions of existing and proposed conditions, any drainage issues related to the site, summary of the findings or conclusions, off-site hydrology, onsite hydrology, hydraulic calculations and a hydrology map.

Imperial Irrigation District

The IID is an irrigation district organized under the California Irrigation District Law, codified in Section 20500 et seq. of the California Water Code. Critical functions of IID include diversion and delivery of Colorado River water to the Imperial Valley, operation and maintenance of the drainage canals and facilities, including those in the project area, and generation and distribution of electricity. Several policy documents govern IID operations and are summarized below:

- The Law of the River and historical Colorado River decisions, agreements and contracts
- The Quantification Settlement Agreement and Transfer Agreements
- The Definite Plan, now referred to as the Systems Conservation Plan, which defines the rigorous agricultural water conservation practices being implemented by growers and IID to meet the Quantification Settlement Agreement commitments
- The Equitable Distribution Plan, which defines how IID will prevent overruns and stay within the cap on the Colorado River water rights
- Existing IID standards and guidelines for evaluation of new development and define IID's role as a responsible agency and wholesaler of water

Integrated Water Resources Management Plan

In relation to the project, IID maintains regulation over the drainage of water into their drains, including the design requirements of stormwater retention basins. IID requires that retention basins be sized to handle an entire rainfall event in case the IID system is at capacity. Additionally, IID requires that outlets to IID facilities be no larger than 12 inches in diameter and must contain a backflow prevention device (IID 2009).

3.10.3 Impacts and Mitigation Measures

Thresholds of Significance

Based on CEQA Guidelines Appendix G, project impacts related to hydrology/water quality are considered significant if any of the following occur:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade groundwater water quality
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin
- 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:
 - Result in substantial erosion or siltation on- or off-site
 - Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite
 - 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
 - Impede or redirect flood flows
- In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan

Methodology

The drainage design will be conducted in accordance with the County of Imperial's design criteria, which establishes that 100 percent of the 100-year storm (3 inches of rain) will be stored on-site and released into the IID drainage system using existing drainage connections.

Impact Analysis

Impact Would the project violate any water quality standards or waste discharge 3.10-1 requirements or otherwise substantially degrade groundwater water quality?

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Construction

Construction of the project includes site preparation, foundation construction, erection of major equipment and structures, installation of electrical systems, control systems, and startup/ testing. In addition, the construction of transmission lines, utility pole pads, conductors, and associated structures will be required.

During the construction phase, sedimentation and erosion can occur because of tracking from earthmoving equipment, erosion and subsequent runoff of soil, or improperly designed stockpiles. The utilization of proper erosion and sediment control BMPs is critical in preventing discharge to surface waters/drains. The project would employ proper SWPPP practices to minimize any discharges in order to meet the Best Available Technology/Best Conventional Technology standard set forth in the Construction General Permit.

The project has the potential to affect surface water quality. Many different types of hazardous compounds will be used during the construction phase, with proper application, management, and containment being of high importance. Poorly managed construction materials can lead to the possibility for exposure of potential contaminants to precipitation. When this occurs, these visible and/or non-visible constituents become entrained in storm water runoff. If they are not intercepted or are left uncontrolled, the polluted runoff would otherwise freely sheet flow from the project to the IID Imperial Valley Drains and could result in the accumulation of these pollutants in the receiving waters. This is considered a potentially significant impact. With the implementation of Mitigation Measure HYD-1, impacts on surface water quality as attributable to the project would be reduced to a less than significant level. Prior to construction and grading activities, the project applicant is required to file an NOI with the SWRCB to comply with the General NPDES Construction Permit and prepare a SWPPP, which addresses the measures that would be included during construction or the project to minimize and control construction and post-construction runoff to the "maximum extent practicable." In addition, NPDES permits require the implementation of BMPs that achieve a level of pollution control to the maximum extent practical. With the implementation of Mitigation Measures HYD-1, impacts on surface water quality as attributable to the project would be reduced to a less than significant level through the inclusion of focused BMPs for the protection of surface water resources. Monitoring and contingency response measures would be included to verify compliance with water quality objectives for all surface waters crossed during construction. In addition, given that site decommissioning would result in similar activities as identified for construction, these impacts could also occur in the future during site restoration activities.

Operation

As runoff flows over developed surfaces, water can entrain a variety of potential pollutants including, but not limited to, oil and grease, pesticides, trace metals, and nutrients. These pollutants can become suspended in runoff and carried to receiving waters. These effects are commonly referred to as non-point source water quality impacts.

Long-term operation of the solar facility poses a limited threat to surface water quality after the completion of construction. The project would be subject to the County's Grading Regulations as specified in Section 91010.02 of the Ordinance Code. However, since the project site is located in unincorporated Imperial County and not subject to a Municipal Separate Storm Sewer System or NPDES General Industrial Permit, there is no regulatory mechanism in place to address post-construction water quality concerns. Based on this consideration, the project has the potential to result in both direct and indirect water quality impacts that could be significant. Implementation of

Mitigation Measure HYD-2 would require the project to incorporate post-construction BMPs into the project's drainage plan. The proposed project will be designed to include site design, source control, and treatment control BMPs, as described below. The use of source control, site design, and treatment BMPs would result in a decrease potential for storm water pollution.

Site Design BMPs. The project will be designed to include site design BMPs, which reduce runoff, prevent storm water pollution associated with the project, and conserve natural areas onsite. Table 3.10-3 lists the various site design BMPs.

Table 3.10-3. Site Design Best Management Practices

	Design Concept	Description
1	Minimize Impervious Footprint	The project site will include a significant amount of undeveloped land and pervious area. The footprint for the solar arrays will be predominately pervious ground. A minimal amount of Class II base paving for access roads and parking will be constructed.
2	Conserve Natural Areas	Only a small amount of existing site area can be classified as natural landscape and will only be disturbed in necessary areas at the project.
3	Protect Slopes and Channels	The project site and surrounding areas is comprised of extremely flat topography. Erosion of slopes due to stabilization problems is not a concern.
4	Minimize Directly Connected Impervious Areas	No storm drain will be constructed onsite. The site layout does not change the existing drainage pattern.

Source Control BMPs. Source control BMPs (both structural and non-structural) means land use or site planning practices, or structures that aim to prevent urban runoff pollution by reducing the potential for contamination at the source of pollution. Source control BMPs minimize the contact between pollutants and urban runoff. Table 3.10-4 identifies source control BMPs that would be applicable to the proposed project.

Table 3.10-4. Source Control Best Management Practices

	Design Concept	Description
1	Design Trash Storage Areas to Reduce Pollution Introduction	Any outdoor trash storage areas will be designed not to allow run-on from adjoining areas, screened or walled to prevent off-site transport of trash.
2	Activity Restrictions	Restrictions include activities that have the potential to create adverse impacts on water quality.
3	Non-storm Water Discharges	Illegal dumping educational materials as well as spill response materials will be provided to employees.
4	Outdoor Loading and Unloading	Material handling will be conducted in a manner as to prevent any storm water pollution.
5	Spill Prevention, Control, and Cleanup	The project will require a Spill Prevention, Control, and Countermeasure Plan, and a Hazardous Materials Business Plan in accordance with Federal and State requirements.
6	Education	Employees will receive materials for storm water pollution prevention in the form of brochures and other information in a format approved by the County of Imperial.

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Table 3.10-4. Source Control Best Management Practices

	Design Concept	Description	
7	Integrated Pest Management	If any pesticide is required onsite, the need for pesticide use in the project design will be reduced by:	
		Keeping pests out of buildings using barriers, screens, and caulking	
		Physical pest elimination techniques, such as squashing, trapping, washing or pruning out pests	
		Relying on natural enemies to eat pests	
		Proper use of pesticides as a last line of defense	
8	Vehicle and Equipment Fueling, Cleaning, and Repair	All vehicles will be serviced offsite whenever possible. If servicing is required onsite, it must be conducted in an area isolated from storm drain inlets or drainage ditch inlets. The area must be bermed and precluded from run on. Any spillage must be fully contained and captured and disposed of per County of Imperial Hazardous Waste requirements.	
9	Waste Handling and Disposal	Materials will be disposed of in accordance with Imperial County Hazardous Material Management guidelines and will be sent to appropriate disposal facilities. Under no circumstances shall any waste or hazardous materials be stored outside without secondary containment.	

Treatment Control BMPs. The proposed project will incorporate post-construction Low Impact Development Treatment Control BMPs, including but not limited to infiltration trenches or bioswales, which shall be investigated and integrated into the project layout to the maximum extent practicable. The drainage plan shall provide both short-term and long-term drainage solutions to ensure the proper sequencing of drainage facilities and treatment of runoff generated from project impervious surfaces prior to off-site discharge.

The proposed project shall develop a long-term maintenance plan and implemented to support the functionality of treatment control BMPs. The facility layout shall also include sufficient container storage and on-site containment and pollution-control devices for drainage facilities to avoid the off-site release of water quality pollutants, including, but not limited to oil and grease, fertilizers, treatment chemicals, and sediment.

Mitigation Measure(s)

,

HYD-1

Prepare SWPPP and Implement BMPs Prior to Construction and Site Restoration. The project applicant or its contractor shall prepare a SWPPP specific to the project and be responsible for securing coverage under SWRCB's NPDES stormwater permit for general construction activity (Order 2009-0009-DWQ). The SWPPP shall identify specific actions and BMPs relating to the prevention of stormwater pollution from project-related construction sources by identifying a practical sequence for site restoration, BMP implementation, contingency measures, responsible parties, and agency contacts. The SWPPP shall reflect localized surface hydrological conditions and shall be reviewed and approved by the appropriate agency prior to commencement of work and shall be made conditions of the contract with the contractor selected to build and decommission the project. The SWPPP shall incorporate control measures in the following categories:

- Soil stabilization and erosion control practices (e.g., hydroseeding, erosion control blankets, mulching)
- Sediment control practices (e.g., temporary sediment basins, fiber rolls)
- Temporary and post-construction on- and off-site runoff controls
- Special considerations and BMPs for water crossings and drainages
- Monitoring protocols for discharge(s) and receiving waters, with emphasis place on the following water quality objectives: dissolved oxygen, floating material, oil and grease, potential of hydrogen (pH), and turbidity
- Waste management, handling, and disposal control practices
- Corrective action and spill contingency measures
- Agency and responsible party contact information
- Training procedures that shall be used to ensure that workers are aware of permit requirements and proper installation methods for BMPs specified in the SWPPP

The SWPPP shall be prepared by a Qualified SWPPP Practitioner and/or Qualified SWPPP Developer with BMPs selected to achieve maximum pollutant removal and that represent the best available technology that is economically achievable. Emphasis for BMPs shall be placed on controlling discharges of oxygen-depleting substances, floating material, oil and grease, acidic or caustic substances or compounds, and turbidity. BMPs for soil stabilization and erosion control practices and sediment control practices will also be required. Performance and effectiveness of these BMPs shall be determined either by visual means where applicable (i.e., observation of above-normal sediment release), or by actual water sampling in cases where verification of contaminant reduction or elimination, (inadvertent petroleum release) is required to determine adequacy of the measure.

Incorporate Post-Construction Runoff BMPs into Project Drainage Plan. The project Drainage Plan shall adhere to the County's Engineering Guidelines Manual, IID "Draft" Hydrology Manual, or other recognized source with approval by the County Engineer to control and manage the on- and off-site discharge of stormwater to existing drainage systems. Infiltration basins will be integrated into the Drainage Plan to the maximum extent practical. The Drainage Plan shall provide both shortand long-term drainage solutions to ensure the proper sequencing of drainage facilities and management of runoff generated from project impervious surfaces as necessary.

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Significance after Mitigation

With the implementation of Mitigation Measure HYD-1, impacts on surface water quality as attributable to the project would be reduced to a less than significant level through the inclusion of focused BMPs for the protection of surface water resources. Monitoring and contingency response measures would be included to verify compliance with water quality objectives for all surface waters crossed during construction.

With the implementation of Mitigation Measure HYD-2, potential water quality impacts resulting from post-construction discharges during operation for the project would be reduced to a less than significant level. Implementation of Mitigation Measure HYD-2 would require the project to incorporate post-construction BMPs into the project's drainage plan. The use of source control, site design, and treatment BMPs would result in a decrease potential for storm water pollution.

Impact Would the project substantially decrease groundwater supplies or interfere 3.10-2 substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

The proposed project would not require the construction of a groundwater well and/or the direct use of groundwater for construction or operation. As described in Chapter 2 Project Description, approximately 20,000 to 30,000 gallons of water per day would initially be required for grading, dropping to much less for the remainder of the project construction. Construction water needs would be limited to earthwork, soil conditioning, dust suppression, and compaction efforts. Water would be obtained from a ground storage tank existing onsite which fills from the Best Canal along the eastern property boundary. Water may also be obtained from a nearby canal or lateral and delivered to the construction location by a water truck capable of carrying approximately 4,000 gallons per load (Appendix H of this EIR).

According to the Water Supply Assessment prepared for the project (Appendix H of this EIR), the anticipated water demand for construction, operation, and decommissioning of the project is estimated to be 151.8 acre-feet (AF), for an annualized demand of 5.06 acre-feet per year (AFY) for the 30-year project life. Water for the project site will be supplied through an Interim Water Supply Policy (IWSP) Water Supply Agreement with IID to process the untreated Colorado River water for the proposed project. The IWSP sets aside 25,000 AFY of IID's Colorado River water supply to serve new non-agricultural projects. As of October 2021, a balance of 23,800 AFY remain available under the IWSP for new non-agricultural projects ensuring reasonably sufficient supplies for such projects. As discussed in Section 3.15, Utilities and Service Systems, the project is expected to consume 151.8 AF for the 30-year lifespan of the project which would equate to 5.06 AFY amortized representing 0.02% of the annual unallocated supply set aside for new non-agricultural projects (Appendix H of this EIR).

Further, groundwater recharge in the area will not be significantly affected as the majority of the project site will feature a pervious landscape in both the existing and proposed conditions. Any runoff from solar panel washing would evaporate or percolate through the ground, as a majority of the surfaces in the solar field would remain pervious. The proposed project would not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin. No significant impacts on groundwater supply or recharge would occur.

3.10 Hydrology/Water Quality Final EIR | Brawley Solar Energy Project

Mitigation Measure(s)

No mitigation measures are required.

Impact 3.10-3

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:

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

Project implementation would not substantially alter the existing drainage pattern of the site or area. Soil erosion could result during construction of the proposed project in association with grading and earthmoving activities. The project site would be disturbed by construction activities such as grading and clearing as a part of site preparation. To the extent feasible, site preparation would be planned and designed to minimize the amount of earth movement. Compaction of the soil to support building and traffic loads as well as the PV module supports may be required and is dependent on final engineering design. During construction, erosion would be controlled in accordance with County standards which include preparation, review and approval of a grading plan by the County Engineer; implementation of a Dust Control Plan (Rule 801); and compliance with the NPDES General Construction Permit and project-specific SWPPP, as outlined in Mitigation Measure HYD-1.

After construction is complete, all existing roads would be left in a condition equal to or better than their preconstruction condition. All other areas disturbed by construction activities would be recontoured and decompacted. As such, daily operations and routine maintenance (such as occasional PV panel washing) are not anticipated to alter the existing drainage pattern such that erosion increases when compared to existing conditions. The project site would remain largely impervious over the operational life of the project. Additionally, the project would implement site design BMPs, as outlined in Table 3.10-3, which would reduce soil disturbance during operation. The proposed project would result in less than significant impacts associated with the alteration of drainage patterns resulting in substantial erosion or siltation on- or off-site.

Mitigation Measure(s)

No additional mitigation measures beyond Mitigation Measures HYD-1 are required.

Significance after Mitigation

With the implementation of Mitigation Measure HYD-1, potential impacts associated with the alteration of drainage patterns resulting in substantial erosion or siltation on- or off-site would be reduced to a level less than significant through compliance with County standards, implementation of a Dust Control Plan (Rule 801), and compliance with the NPDES General Construction Permit and project-specific SWPPP.

Impact 3.10-4

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:

Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite?

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Project implementation would not substantially alter the existing drainage pattern of the site or area. The majority of the project site would continue to sheet flow through the pervious native soils. The project will be designed to meet County of Imperial storage requirements (100 percent of the 100-year storm (3 inches of rain)) (refer to the County's *Engineering Guidelines Design Guidelines Manual for the Preparation and Checking of Street Improvement, Drainage and Grading Plans within Imperial County* (2008) for storm water runoff, which will result in an impoundment of runoff in excess of the anticipated volume of runoff to be generated by the 100-year storm event. Additionally, implementation of Mitigation Measure HYD-2 requires that the project Drainage Plan adhere to the County's Engineering Guidelines Manual, IID "Draft" Hydrology Manual, or other recognized source with approval by the County Engineer to control and manage the on- and off-site discharge of stormwater to existing drainage systems. As such, infiltration basins will be integrated into the Drainage Plan to the maximum extent practical. The Drainage Plan shall provide both short- and long-term drainage solutions to ensure the proper sequencing of drainage facilities and management of runoff generated from project impervious surfaces as necessary.

Additionally, after construction is complete, all existing roads would be left in a condition equal to or better than their preconstruction condition. All other areas disturbed by construction activities would be recontoured and decompacted. As such, daily operations and routine maintenance (such as occasional PV panel washing) are not anticipated to alter the existing drainage pattern such that flooding (on- or off-site) increases when compared to existing conditions. Lastly, the project site would remain largely impervious over the operational life of the project. Therefore, the proposed project would result in no significant impacts associated with the alteration of drainage patterns resulting in on- or off-site flooding

Mitigation Measure(s)

Implement Mitigation Measure HYD-2.

Significance after Mitigation

With the implementation of Mitigation Measure HYD-2, impacts on existing drainage patterns as a result of potentially substantial increases to runoff would be reduced to a level less than significant. Implementation of Mitigation Measure HYD-2 would require the project's Drainage Plan to adhere to the County's Engineering Guidelines Manual, IID "Draft" Hydrology Manual, or other recognized source with approval by the County Engineer to control and manage the on- and off-site discharge of stormwater to existing drainage systems.

Impact 3.10-5

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:

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?

Project implementation would not substantially alter the existing drainage pattern of the site or area. During construction, erosion and associated pollutants would be controlled in accordance with County standards which include preparation, review and approval of a grading plan by the County Engineer; implementation of a Dust Control Plan (Rule 801); and compliance with the NPDES

General Construction Permit and project-specific SWPPP, as outlined in Mitigation Measure HYD-1 (see Impact 3.10-1 for additional details).

After construction is complete, all existing roads would be left in a condition equal to or better than their preconstruction condition. All other areas disturbed by construction activities would be recontoured and decompacted. The proposed project is not anticipated to generate a significant increase in the amount of runoff water when compared to existing conditions. As such, daily operations and routine maintenance (such as occasional PV panel washing) are not anticipated to alter the existing drainage pattern such that runoff increases would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. The project site would remain largely impervious over the operational life of the project. Water will continue to percolate through the ground, as a majority of the surfaces on the project site will remain pervious. The proposed project would not 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. This is considered a less than significant impact.

Mitigation Measure(s)

Implement Mitigation Measure HYD-1.

Significance after Mitigation

With the implementation of Mitigation Measure HYD-1, impacts on the existing drainage pattern by the project that could result in substantial or polluted runoff would be reduced to a level less than significant through compliance with County standards, implementation of a Dust Control Plan (Rule 801), and compliance with the NPDES General Construction Permit and project-specific SWPPP.

Impact 3.10-6

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:

Impede or redirect flood flows?

Project implementation would not substantially alter the existing drainage pattern of the site or area. The proposed project is not anticipated to generate a significant increase in the amount of runoff water from water use involving solar panel washing. Water will continue to percolate through the ground, as a majority of the surfaces on the project site will remain pervious. Additionally, according to the FEMA's FIRM (Map Number Map Number 06025C1025C) (FEMA 2008), the proposed solar energy facility, gen-tie line, and access roads located on the project site are located in Zone X (unshaded). The FEMA Zone X (unshaded) designation is an area determined to be outside the 0.2 percent annual chance floodplain. Therefore, the proposed project would not 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 impede or redirect flood flows, and impacts would be less than significant.

Mitigation Measure(s)

No mitigation measures are required.

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Impact In flood hazard, tsunami, or seiche zones, would the project risk release of 3.10-7 pollutants due to project inundation?

The project site is not located near any large bodies of water. The Salton Sea is located approximately 11.2 miles northwest of the project site. Because of the distance, the Salton Sea does not pose a danger of inundation from seiche or tsunami as related to the project site. Furthermore, the project site is over 100 miles inland from the Pacific Ocean. In addition, the project site is relatively flat. Therefore, there is no potential for the project site to be inundated by seiches or tsunamis. No impact would occur.

Mitigation Measure(s)

No mitigation measures are required.

Impact Would the project conflict with or obstruct implementation of a water quality 3.10-8 control plan or sustainable groundwater management plan?

As described under Impact 3.10-1 above, with the implementation of Mitigation Measure HYD-1, impacts on surface water quality as attributable to the project would be reduced to a less than significant level through the inclusion of focused BMPs for the protection of surface water resources. Implementation of Mitigation Measure HYD-2 would require the project to incorporate post-construction BMPs into the project's drainage plan. The use of source control, site design, and treatment BMPs would result in a decrease potential for storm water pollution. Additionally, the project would not require the direct use of groundwater. Therefore, the proposed project would not pose a significant threat to local surface water features or shallow groundwater resources, and, as such would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. Implementation of Mitigation Measures HYD-1 and HYD-2 would reduce impacts to a level less than significant.

Mitigation Measure(s)

No additional mitigation measures beyond Mitigation Measures HYD-1 and HYD-2 are required.

Significance after Mitigation

With the implementation of Mitigation Measures HYD-1 and HYD-2, the potential water quality impacts resulting during construction and operation of the project would be reduced to a level less than significant.

3.10.4 Decommissioning/Restoration and Residual Impacts

Decommissioning/Restoration

If at the end of the PPA term, no contract extension is available for a power purchaser, no other buyer of the energy emerges, or there is no further funding of the project, the project will be decommissioned and dismantled. Decommissioning and restoration activities would result in similar impacts on hydrology and water quality as would occur during construction of the proposed project. The primary water quality issue associated with decommissioning/restoration would be potential impacts on surface water quality, as the decommissioning activities would be similar to construction

activities, and would be considered a significant impact. However, during decommissioning, soil erosion would be controlled in accordance with NPDES General Construction Permit(s) and project-specific SWPPP. Compliance with requirements and best available control technologies in place at the time of decommissioning are anticipated to be similar to, or more stringent than, those currently required. Compliance with all applicable water quality regulations would reduce the project's impacts during decommissioning to a level less than significant. Impacts on other water resource issues, including alteration of drainage patterns, contributing to off-site flooding, impacts on groundwater recharge and supply, would be less than significant. There would be no impact associated with inundation from flooding or mudflows.

Residual

With implementation of the mitigation measures listed above, implementation of the project would not result in any residual significant impacts related to increased risk of flooding from stormwater runoff, from water quality effects from long-term urban runoff, or from short-term alteration of drainages and associated surface water quality and sedimentation. With the implementation of the required mitigation measures during construction and decommissioning of the project, water quality impacts would be minimized to a less than significant level. Based on these circumstances, the project would not result in any residential significant and unmitigable adverse impacts on surface water hydrology and water quality.

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3.11 Land Use/Planning

This section provides information regarding current land use, land use designations, and land use policies within and in the vicinity of the project site. Section 15125(d) of the CEQA Guidelines states that "[t]he EIR shall discuss any inconsistencies between the project and applicable general plans and regional plans." This section fulfills this requirement for the project. In this context, this section reviews the land use assumptions, designations, and policies of the County General Plan and other applicable federal, state, and local requirements, which govern land use within the project area and evaluates the project's potential to conflict with policies adopted for the purpose of avoiding or mitigating significant environmental effects. Where appropriate, mitigation is applied and the resulting level of impact identified.

3.11.1 Existing Conditions

The project site is located on approximately 227 acres of privately-owned land in the unincorporated area of Imperial County, CA (Figure 3-1). The site is approximately one mile north from the City of Brawley's jurisdictional limit. The project site is south of Baughman Road, west of N Best Avenue, and north of Andre Road. The Union Pacific Railway transects the project site. Table 3.11-1 identifies the individual assessor's parcel numbers (APN) associated with the project site with their respective acreage, General Plan land use designation, and zoning.

Table 3.11-1. Project Assessor Parcel Numbers, Acreages, and Zoning

APN	Acreage	General Plan Land Use	Zoning		
037-140-020	61.73	Agriculture A-2-G		61.73 Agriculture A-2-G	A-2-G
037-140-021	68.71	Agriculture	A-2-G		
037-140-022	38.15	Agriculture	A-2-G		
037-140-023	24.71	Agriculture	A-2-G		
037-140-006	33.68	Agriculture	A-2-G		
Total Gross Acres	227				

APN = assessor parcel number; A-2-G = General Agricultural with Geothermal Overlay

As shown on Figure 3.11-1, the project site's land use is designated Agriculture under the County's General Plan. As depicted on Figure 3.11-2, the solar energy facility site is located on a total of five privately-owned legal parcels zoned A-2-G (General Agriculture with Geothermal Overlay). The proposed 1.8-mile gen-tie line would originate from the southern edge of the project site and then head west along Andre Road to interconnect to the IID existing North Brawley Geothermal Power Plant substation, located at Hovley Road and Andre Road.

Figure 3.11-1. General Plan Land Use Designations N Best/Ave Baughman Rd 037-140-021 037-140-020 037-140<mark>-</mark>023 City of Brawley Wastewater Treatment Plant 037-140-022 Howley Rd 037-140-006 Andre Rd Ward Rd Andre Rd North Brawley Geothermal Power Plant North Brawley Geothermal Power Plant Substation -Point of Interconnection Del Rio Country Club Golf Course Shank Rd Fredericks Rd 78 Slider Rd Brawley Dump Rd Legend General Plan Land Use Project Location Gen-Tie Line Agriculture Special Point of Interconnection

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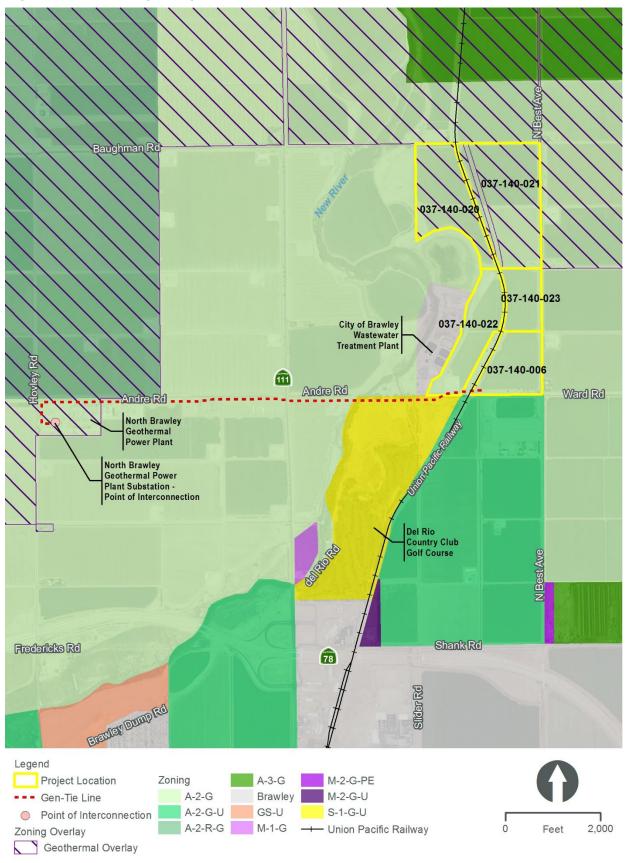
Urban

-- Union Pacific Railway

2,000

Feet





As discussed in Chapter 2, the County adopted the Renewable Energy and Transmission Element, which includes a RE Zone (RE Overlay Map). The RE Overlay Zone is concentrated in areas determined to be the most suitable for the development of renewable energy facilities while minimizing the impact on other established uses. As shown on Figure 3.11-2, the northern portion of the project site (APNs 037-140-020 and 037-140-021) is located within the Geothermal Overlay Zone, which is a component of the RE Overlay Zone. However, the entire southern portion of the project site (APNs 037-140-022, 037-140-023, and 037-140-006) is located adjacent to, but outside of the RE Overlay Zone. The applicant is requesting a General Plan Amendment to include/classify the southern three project parcels into the RE Overlay Zone, so that the entire site would be located within the RE Overlay Zone. No change in the underlying General Plan land use (Agriculture) is proposed.

The project applicant is seeking a zone change to include/classify all five project parcels into the Renewable Energy/Geothermal (REG) Overlay Zone (A-2-REG). Further, implementation of the project would require the approval of a CUP by the County to allow for the construction and operation of the proposed solar energy facility with an integrated battery storage system.

3.11.2 Regulatory Setting

This section identifies and summarizes state and local laws, policies, and regulations that are applicable to the project.

State

State Planning and Zoning Laws

California Government Code Section 65300 et seq. establishes the obligation of cities and counties to adopt and implement general plans. The general plan is a comprehensive, long-term, and general document that describes plans for the physical development of a city or county and of any land outside its boundaries that, in the city's or county's judgment, bears relation to its planning.

The general plan addresses a broad range of topics, including, at a minimum, land use, circulation, housing, conservation, open space, noise, and safety. In addressing these topics, the general plan identifies the goals, objectives, policies, principles, standards, and plan proposals that support the city's or county's vision for the area. The general plan is a long-range document that typically addresses the physical character of an area over a 20-year period or more.

The State Zoning Law (California Government Code Section 65800 et seq.) establishes that zoning ordinances, which are laws that define allowable land uses within a specific zone district, are required to be consistent with the general plan and any applicable specific plans.

3.11.2.1 Regional

Southern California Association of Governments – 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy (Connect SoCal)

SCAG is the designated metropolitan planning organization for Los Angeles, Ventura, Orange, San Bernardino, Riverside, and Imperial Counties. CEQA requires that regional agencies like SCAG review projects and plans throughout its jurisdiction. SCAG, as the region's "Clearinghouse," collects information on projects of varying size and scope to provide a central point to monitor regional activity. SCAG has the responsibility of reviewing dozens of projects, plans, and programs every month.

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Projects and plans that are regionally significant must demonstrate to SCAG their consistency with a range of adopted regional plans and policies.

On September 3,2020, SCAG adopted the 2020-2045 RTP/SCS (Connect SoCal). The 2020-2045 RTP/SCS (Connect SoCal) includes a strong commitment to reduce emissions from transportation sources to comply with Senate Bill 375, improve public health, and meet the NAAQS as set forth by the federal CAA. The following goals from the 2020-2045 RTP/SCS (Connect SoCal) are considered applicable to the proposed project:

- Goal 5: Reduce GHG emissions and improve air quality
- Goal 10: Promote conservation of natural and agricultural lands and restoration of habitats

Local

County of Imperial General Plan

The purpose of the County's General Plan (as amended through 2008) is to direct growth, particularly urban development, to areas where public infrastructure exists or can be provided, where public health and safety hazards are limited, and where impacts on the County's abundant natural, cultural, and economic resources can be avoided. The following 10 elements comprise the County's General Plan: Land Use; Housing; Circulation and Scenic Highways; Noise; Seismic and Public Safety; Conservation and Open Space; Agricultural; Renewable Energy and Transmission Element; Water; and Parks and Recreation. Together, these elements satisfy the seven mandatory general plan elements as established in the California Government Code. Goals, objectives, and implementing policies and actions programs have been established for each of the elements.

Imperial County received funding from the CEC's Renewable Energy and Conservation Planning Grant to amend and update the County's General Plan in order to facilitate future development of renewable energy projects. The Geothermal/Alternative Energy and Transmission Element was last updated in 2006. Since then, there have been numerous renewable projects proposed, approved and constructed within Imperial County as a result of California's move to reduce greenhouse gas emissions, develop alternative fuel sources and implement its Renewable Portfolio Standard. The County has recently prepared an update to the Geothermal/Alternative Energy and Transmission Element of its General Plan, called the Renewable Energy and Transmission Element. This Element is designed to provide guidance and approaches with respect to the future siting of renewable energy projects and electrical transmission lines in the County. The County adopted this element in 2016.

The RE and Transmission Element includes a RE Zone (RE Overlay Map). The County Land Use Ordinance, Division 17, includes the RE Overlay Zone, which authorizes the development and operation of RE projects, with an approved CUP. The RE Overlay Zone is concentrated in areas determined to be the most suitable for the development of RE facilities while minimizing the impact to other established uses. As <u>discussed previously and</u> shown on Figure 3.11-2, the <u>northern portion of the project site</u> is located <u>within the RE Overlay Zone</u>; <u>whereas the southern portion of the project site</u> is outside of the RE Overlay Zone.

An analysis of the project's consistency with the General Plan goals and objectives relevant to the project is provided in Table 3.11-2. While this EIR analyzes the project's consistency with the General Plan pursuant to CEQA Guidelines Section 15125(d), the Imperial County Planning Commission and Board of Supervisors retain final authority for the determination of the project's consistency with the General Plan.

Table 3.11-2. Project Consistency with Applicable General Plan Policies

Applicable Policies	Consistency Determination	Analysis
Land Use Element		
Public Facilities, Objective 8.7. Ensure the development, improvement, timing, and location of community sewer, water, and drainage facilities will meet the needs of existing communities and new developing areas.	Consistent	The project includes the necessary supporting infrastructure and would not require new community-based infrastructure. The project would be required to construct supporting drainage consistent with County requirements and mitigation measures prescribed in Section 3.10, Hydrology/Water Quality, of the EIR. Once the project is operational, water would be required for solar panel washing and fire protection. The project would receive water service from the IID. Water would be purchased from the IID and delivered to the project site by water trucks. The proposed project would not require an operations and maintenance building. Therefore, no septic or other wastewater disposal systems would be required for the project.

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Applicable Policies	Consistency Determination	Analysis
Public Facilities, Objective 8.8. Ensure that the siting of future facilities for the transmission of electricity, gas, and telecommunications is compatible with the environment and County regulation.	Consistent	The County Land Use Ordinance, Division 17, includes the Renewable Energy Overlay Zone, which authorizes the development and operation of renewable energy projects with an approved CUP. The RE Overlay Zone is concentrated in areas determined to be the most suitable for the development of renewable energy facilities while minimizing the impact on other established uses. CUP applications proposed for specific renewable energy projects not located in the RE Overlay Zone would not be allowed without an amendment to the RE Overlay Zone.
		The County's General Plan and Land Use Ordinance allows that for renewable energy projects proposed on land classified in a non-RE Overlay zone, that the land on which the project is located may be included/classified in the RE Overlay Zone if the renewable energy project: 1) would be located adjacent to an existing RE Overlay Zone; 2) is not located in a sensitive area; 3) is located in proximity to renewable energy infrastructure; and, 4) and would not result in any significant environmental impacts.
		As shown on Figure 3.11-2, the northern portion of the project site is located within the RE Overlay Zone, as the RE Overlay Zone includes the Geothermal Overlay Zone. However, the southern portion of the entire-project site is located outside, but immediately adjacent to eff the RE Overlay Zone. Therefore, the applicant is requesting a General Plan Amendment to include/classify the southern three all five-project parcels into the RE Overlay Zone. With the approval of the General Plan Amendment, CUP, and zone change to include/reclassify all the project parcels to A-2-REG the proposed solar project can be implemented.
Public Facilities, Objective 8.9. Require necessary public utility rights-of-way when appropriate.	Consistent	The project would include the dedication of necessary ROW to facilitate the placement of electrical distribution and transmission infrastructure.
Protection of Environmental Resources, Objective 9.6. Incorporate the strategies of the Imperial County AQAP in land use planning decisions and as amended.	Consistent	Because of the minimal grading of the site during construction and limited travel over the site during operations, local vegetation is anticipated to remain largely intact which will assist in dust suppression. Furthermore, dust suppression will be implemented including the use of water and soil binders during construction. Section 3.3, Air Quality, discusses the project's consistency with the AQAP in more detail.

Applicable Policies	Consistency Determination	Analysis				
Circulation and Scenic Highways Element						
Safe, Convenient, and Efficient Transportation System, Objective 1.1. Maintain and improve the existing road and highway network, while providing for future expansion and improvement based on travel demand and the development of alternative travel modes.	Consistent	Once construction is completed, the project would be remotely operated, controlled and monitored and with no requirement for daily onsite employees. The project would include limited operational vehicle trips and would not be expected to reduce the current level of service at affected intersections, roadway segments, and highways. The project does not propose any forms for residential or commercial development and therefore would not require new forms of alternative transportation to minimize impacts on existing roadways.				
Safe, Convenient, and Efficient Transportation System, Objective 1.2. Require a traffic analysis for any new development which may have a significant impact on County roads.	Consistent	As described in Section 3.13, Transportation, a traffic study was prepared for the project and demonstrated that project operations would have a less than significant impact on the circulation network.				
Noise Element						
Noise Environment. Objective 1.3. Control noise levels at the source where feasible.	Consistent	Where construction-related and operational noise would occur in close proximity to noise sensitive land uses (e.g. less than 500 feet), the County would condition the project to maintain conformance with County noise standards.				
Project/Land Use Planning. Goal 2: Review Proposed Actions for noise impacts and require design which will provide acceptable indoor and outdoor noise environments.	Consistent	The project would be required to comply with the County's noise standards during both construction and operation.				
Conservation and Open Space Element						
Conservation of Environmental Resources for Future Generations Goal 1: Environmental resources shall be conserved for future generations by minimizing environmental impacts in all land use decisions and educating the public on their value.	Consistent	The project site would be converted from undeveloped land to a solar energy facility. The proposed project is a response to the state's need for renewable energy to meet its Renewable Portfolio Standard, and while it would increase the availability of renewable energy, it would also replace existing sources of non-renewable energy. The power generated by the proposed project would be added to the state's electricity grid with the intent that it would displace fossil fueled power plants and their associated environmental impacts (i.e., air quality and GHG emissions). The proposed project would ensure future generations have access to a broad array of renewable energy sources, providing the public with alternative choices to fossil fuels.				

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Applicable Policies	Consistency Determination	Analysis
Conservation of Biological Resources. Goal 2: The County will integrate programmatic strategies for the conservation of critical habitats to manage their integrity, function, productivity, and long-term viability.	Consistent	A biological resources survey was conducted for the project site. As discussed in Section 3.5, Biological Resources, there are potentially sensitive biological resources located within the project site. However, with the implementation of mitigation identified in Section 3.5, Biological Resources, these impacts would be reduced to a level less than significant.
Preservation of Cultural Resources. Objective 3.1: Protect and preserve sites of archaeological, ecological, historical, and scientific value, and/or cultural significance.	Consistent	A cultural resource inventory was prepared for the project site. As discussed in Section 3.6, Cultural Resources, the proposed project has the potential to encounter undocumented archaeological resources and human remains. Mitigation Measures CUL-1 through CUL-7 have been identified to reduce potential impacts to a level less than significant.
Conservation of Water Resources. Objective 6.1: Ensure the use and protection of all the rivers, waterways, and groundwater sources in the County for use by future generations.	Consistent	As discussed in Section 3.10, Hydrology/Water Quality, the project will prepare a site-specific drainage plan and water quality management plan to minimize adverse effects to local water resources; as well as coordinate with the IID for water consumption during construction and operation of the project.
Protection of Air Quality and Addressing Climate Change. Goal 7: The County shall actively seek to improve the quality of air in the region.	Consistent	The proposed project would be required to comply with all applicable ICAPCD rules and requirements during construction and operation to reduce air emissions. Overall, the proposed project would improve air quality and reduce GHG emissions by reducing the amount of emissions that would be generated in association with electricity production from a fossil fuel burning facility. Therefore, the proposed project is consistent with this goal.
Protection of Air Quality and Addressing Climate Change. Objective 7.1: Ensure that all project and facilities comply with current Federal, State and local requirements for attainment of air quality objectives.	Consistent	The proposed project would comply with current federal and State requirements for attainment for air quality objectives through conformance with all applicable ICAPCD rules and requirements to reduce fugitive dust and emissions. Further, the proposed project would comply with the ICAPCD Air Quality CEQA Handbook's Mandatory Standard Air Quality Measures (Applicant Proposed Measure AQ-1). Therefore, the proposed project is consistent with this objective.
Protection of Air Quality and Addressing Climate Change. Objective 7.2: Develop management strategies to mitigate fugitive dust. Cooperate with all federal and state agencies in the effort to attain air quality objectives.	Consistent	The Applicant would cooperate with all federal and State agencies in the effort to attain air quality objectives through compliance with the ICAPCD Air Quality CEQA Handbook's Mandatory Standard Air Quality Measures (Applicant Proposed Measure AQ-1). Therefore, the proposed project is consistent with this objective.

Applicable Policies	Consistency Determination	Analysis
Protection of Open Space and Recreational Opportunities. Objective 8.2: Focus all new renewable energy development within adopted Renewable Energy Overlay Zones.	Consistent	As shown on Figure 3.11-2, the northern portion of the project site (APNs 037-140-020 and 037-140-021) is located within the RE Overlay Zone, as the Geothermal Overlay Zone is a component of the RE Overlay Zone. However, the entire southern portion of the project site is located outside, but immediately adjacent to of the RE Overlay Zone. The project applicant is requesting a General Plan Amendment and Zone Change to include/classify all five project the southern three parcels into the RE Overlay Zone, and a Zone Change to include/classify all five project parcels into the Renewable Energy/Geothermal (REG) Overlay Zone (A-2-REG). With the approval of the General Plan Amendment, Zone Change, and CUP, the proposed solar project can be implemented.
Renewable Energy and Transmission Ele	ment	
Objective 1.4: Analyze potential impacts on agricultural, natural, and cultural resources, as appropriate.	Consistent	This EIR has been prepared to meet the requirements of CEQA for purposes of evaluating the potential environmental impacts associated with the proposed project, which includes analysis on applicable environmental topics that analyze impacts on agricultural, natural, and cultural resources.
Objective 1.5: Require appropriate mitigation and monitoring for environmental issues associated with developing renewable energy facilities.	Consistent	Please refer to Section 3.3, Agricultural Resources, for a description of existing agricultural resources within the project site and a discussion of potential impacts attributable to the project. A biological resources report has been prepared for the project, which is summarized in Section 3.5, Biological Resources, along with potential impacts attributable to the project. With incorporation of mitigation identified in Sections 3.3, Agricultural Resources and 3.5, Biological Resources, less than significant impacts would result.
Objective 1.6: Encourage the efficient use of water resources required in the operation of renewable energy generation facilities.	Consistent	Water use during construction would be used primarily for dust control, and obtained from local IID irrigation canals or laterals in conformance with IID construction water acquisition requirements. The project applicant will also coordinate with IID to purchase water needed for maintenance activities (i.e. PV module washing) to ensure efficient use of water resources.
Objective 1.7: Assure that development of renewable energy facilities and transmission lines comply with Imperial County Air Pollution Control District's regulations and mitigation measures.	Consistent	Because of the minimal grading of the site during construction and limited travel over the site during operations, local vegetation is anticipated to remain largely intact which will assist in dust suppression. Furthermore, dust suppression will be implemented including the use of water and soil binders during construction. Section 3.4, Air Quality, discusses the project's consistency with the ICAPCD in more detail.

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Applicable Policies	Consistency Determination	Analysis			
Objective 2.1: To the extent practicable, maximize utilization of IID's transmission capacity in existing easements or rights-of-way. Encourage the location of all major transmission lines within designated corridors easements, and rights-of-way.	Consistent	The project involves the construction and operation of new renewable energy infrastructure that would interconnect with existing and approved IID transmission infrastructure thereby maximizing the use of existing facilities.			
Seismic and Public Safety Element					
Land Use Planning and Public Safety. Goal 1: Include public health and safety considerations in land use planning.	Consistent	Division 5 of the County Land Use Ordinance has established procedures and standards for development within earthquake fault zones. Per County regulations, construction of buildings			
Land Use Planning and Public Safety. Objective 1.1: Ensure that data on geological hazards is incorporated into the land use review process, and future development process.		intended for human occupancy which are located across the trace of an active fault are prohibited. An exception exists when such buildings located near the fault or within a designated Special Studies Zone are demonstrated through a geotechnical analysis			
Land Use Planning and Public Safety. Objective 1.3: Regulate development adjacent to or near all mineral deposits and geothermal operations.					and report not to expose a person to undue hazard created by the construction. Since the project site is located in a seismically active area, the project is required to be
Land Use Planning and Public Safety. Objective 1.4: Require, where possessing the authority, that avoidable seismic risks be avoided; and that measures, commensurate with risks, be taken to reduce injury, loss of life, destruction of property, and disruption of service.					designed in accordance with the CBC for near source factors derived from a design basis earthquake based on a peak ground acceleration of 0.48 gravity. It should be noted that, the project would be remotely operated and would not require any habitable structures on site. In considering these factors in conjunction with mitigation requirements outlined in the impact analysis, the risks associated with
Land Use Planning and Public Safety. Objective 1.7: Require developers to provide information related to geologic and seismic hazards when siting a proposed project.		seismic hazards would be minimized. A preliminary geotechnical report has been prepared for the proposed project. The preliminary geotechnical report has been referenced in this environmental document.			
Emergency Preparedness. Goal 2: Minimize potential hazards to public health, safety, and welfare and prevent the loss of life and damage to health and property resulting from both natural and human-related phenomena.					Additionally, a design-level geotechnical investigation would be conducted to evaluate the potential for site specific hazards associated with seismic activity.
Emergency Preparedness. Objective 2.2: Reduce risk and damage due to seismic hazards by appropriate regulation.					
Emergency Preparedness. Objective 2.5: Minimize injury, loss of life, and damage to property by implementing all state codes where applicable.					

Applicable Policies	Consistency Determination	Analysis				
Emergency Preparedness. Objective 2.8: Prevent and reduce death, injuries, property damage, and economic and social dislocation resulting from natural hazards including flooding, land subsidence, earthquakes, other geologic phenomena, levee or dam failure, urban and wildland fires and building collapse by appropriate planning and emergency measures.						
Water Element						
Protection of Water Resources from Hazardous Materials. Program: The County of Imperial shall make every reasonable effort to limit or preclude the contamination or degradation of all groundwater and surface water resources in the County.	Consistent	Mitigation measures will require that the applicant of the proposed project prepare a site-specific drainage plan and water quality management plan to minimize adverse effects to local water resources.				
Protection of Water Resources from Hazardous Materials. Program: All development proposals brought before the County of Imperial shall be reviewed for potential adverse effects on water quality and quantity, and shall be required to implement appropriate mitigation measures for any significant impacts.	Consistent	See previous response for Water Element above.				
Housing Element						
Not Applicable. The proposed project is a solar energy project and does not include the development of housing.						

Source: ICPDS 2008

AQAP = air quality attainment plan; CUP = conditional use permit; EIR = environmental impact report; GV = growth visioning; ICAPCD = Imperial County Air Pollution Control District; IID = Imperial Irrigation District; MW = megawatt; RE = renewable energy' ROW = right-of-way;

County of Imperial Land Use Ordinance

The County's Land Use Ordinance provides the physical land use planning criteria for development within the jurisdiction of the County. The Land Use Ordinance identifies the permitted and conditional uses within a zoning designation. Uses identified as conditionally permitted require a CUP, which is subject to the discretionary approval of the County Board of Supervisors per a recommendation by the County Planning Commission.

A-2 Zoning. As depicted on Figure 3.11-2, the solar energy facility site is located on a total of five privately-owned legal parcels zoned A-2-G (General Agriculture with a Geothermal Overlay). Pursuant to Title 9, Division 5, Chapter 8 (County of Imperial 2019a), the following uses are permitted in the A-2 zone subject to approval of a CUP from Imperial County: solar energy electrical generator, battery storage facility, electrical substations, communication towers, and facilities for the transmission of electrical energy.

3.11-12 | January 2023 Imperial County The maximum height limit for non-residential structures and commercial communication towers in the A-2 zone is 120 feet. The proposed project's 66-foot-high gen-tie poles and 40 to 100-feet tall microwave tower would not exceed the height limit in the A-2 zone.

RE Resources. According to Title 9, Division 17 of the Land Use Ordinance, the purpose of the RE Resources regulations are to "facilitate the beneficial use of renewable energy resources for the general welfare of the people of Imperial County and the State of California; to protect renewable energy resources from wasteful or detrimental uses; and to protect people, property, and the environment from detriments that might result from the improper use of renewable energy resources" (County of Imperial 2017).

Title 9, Division 17, includes the RE Overlay Zone, which authorizes the development and operation of renewable energy projects, with an approved CUP. Uses that are conditionally permitted require a CUP subject to the discretionary approval of the County Board of Supervisors (Board) per a recommendation by the County Planning Commission.

Imperial County Airport Land Use Compatibility Plan

The Imperial County Airport Land Use Compatibility Plan (ALUCP) provides the criteria and policies used by the Imperial County Airport Land Use Commission to assess compatibility between the principal airports in Imperial County and proposed land use development in the areas surrounding the airports. The ALUCP emphasizes review of local general and specific plans, zoning ordinances, and other land use documents covering broad geographic areas.

The project site is located approximately 1.5 miles north of the Brawley Municipal Airport. However, the project site is outside of the airport compatibility zones of the Brawley Municipal Airport (County of Imperial 1996).

3.11.3 Impacts and Mitigation Measures

This section presents the significance criteria used for considering project impacts related to land use and planning, the methodology employed for the evaluation, an impact evaluation, and mitigation requirements, if necessary.

Thresholds of Significance

Based on CEQA Guidelines Appendix G, project impacts related to land use and planning are considered significant if any of the following occur:

- Physically divide an established community
- 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

Impact Analysis

Impact 3.11-1 Would the project physically divide an established community?

The project site is located in a sparsely populated portion of Imperial County. The following single-family residences are located in the project vicinity:

Residences located near the northwest corner of the project site

- Two residences at the corner of N Best Road and Ward Road
- One residence across the proposed project's primary access road
- One residence across the northeast corner of the project site
- One residence (with a horse boarding/training facility) on the west side of N Best Avenue, located south of the project site)

However, there are no established residential communities located in the vicinity of the project site. The nearest established residential community is located approximately 1.7 miles southwest of the project site in the City of Brawley. Therefore, implementation of the proposed project would not divide an established community and no impact would occur.

Mitigation Measure(s)

No mitigation measures are required.

Impact 3.11-2 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?

SCAG 2020-2045 RTP/SCS (Connect SoCal)

As noted above, the 2020-2045 RTP/SCS (Connect SoCal) (SCAG 2020) identifies two goals which include reducing GHG emissions to improve air quality (Goal 5), and to promote conservation of natural and agricultural lands (Goal 10).

The 2020-2045 RTP/SCS (Connect SoCal), identifies strategies to support the goal of reducing regional GHG and improve air quality. Strategies include leveraging technological innovations including incorporating solar energy, hydrogen fuel cell power storage, and power generation. Once in operation, the proposed project would contribute to SCAG's goal in reducing GHG emissions and improving air quality.

The 2020-2045 RTP/SCS (Connect SoCal) also discusses the decline of agricultural land as an issue for the economy. As discussed in Section 3.3, Agricultural Resources, the majority of the project site is designated as Farmland of Statewide Importance, with a pocket of Prime Farmland and Farmland of Local Importance located in the southern portion of the project site. Approximately 1 acre of Unique Farmland occurs along the western boundary of the project site.

The project would temporarily convert Prime Farmland, Farmland of Statewide Importance, and Unique Farmland to non-agricultural uses. However, as a condition of project approval (CUP condition), the project applicant or its successor in interest will be responsible for implementing a reclamation plan when the project is decommissioned at the end of its lifespan. The reclamation plan includes the removal, recycling, and/or disposal of all solar arrays, inverters, transformers, and other structures on the project site, as well as restoration of the site to its pre-project condition. Therefore, the proposed project would not permanently convert Prime Farmland, Farmland of Statewide Importance, and Unique Farmland to non-agricultural uses. Therefore, no impacts due to a conflict with the 2020-2045 RTP/SCS (Connect SoCal) would occur.

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County of Imperial General

The County's General Plan applies to the solar energy facility, battery storage system, gentie, and supporting infrastructure associated with the project. An analysis of the project's consistency with the General Plan goals and objectives relevant to the project is provided in Table 3.11-2. As shown in Table 3.11-2, the proposed project would generally be consistent with the goals and objectives of the General Plan.

The County Land Use Ordinance, Division 17, includes the Renewable Energy Overlay Zone, which authorizes the development and operation of renewable energy projects with an approved CUP. The RE Overlay Zone is concentrated in areas determined to be the most suitable for the development of renewable energy facilities while minimizing the impact on other established uses. CUP applications proposed for specific renewable energy projects not located in the RE Overlay Zone would not be allowed without an amendment to the RE Overlay Zone, and as stated in the Renewable Energy and Transmission Element:

CUP applications proposed for specific renewable energy projects not located in the RE Overlay Zone would not be allowed without an amendment to the RE Overlay Zone. An amendment to the overlay zone would only be approved by the County Board of Supervisors if a future renewable energy project met one of the following two conditions:

- Adjacent to the Existing RE Overlay Zone: An amendment may be made to allow for development of a future renewable energy project located adjacent to the existing RE Overlay Zone if the project:
 - Is not located in a sensitive area
 - Would not result in any significant impacts
- 2) <u>"Island Overlay"</u>: An amendment may be made to allow for development of a future renewable energy project that is not located adjacent to the existing RE Overlay Zone if the project:
 - Is located adjacent (sharing a common boundary) to an existing transmission source
 - Consists of the expansion of an existing renewable energy operation
 - Would not result in any significant environmental impacts.

As shown on Figure 3.11-2, the northern portion of the project site (APNs 037-140-020 and 037-140-021) is located within the Geothermal Overlay Zone, which is a component of the RE Overlay Zone. However, the entire-southern portion of the project site (APNs 037-140-006, 037-140-022 and 037-140-023) project site is located outside, but immediately adjacent to, the RE Overlay Zone. Therefore, the project applicant is seeking a zone change to include/classify all five project parcels into the Renewable Energy/Geothermal (REG) Overlay Zone (A-2-REG). The project applicant is requesting a General Plan Amendment to include/classify the southern three parcels into the RE Overlay Zone, and a Zone Change to include/classify all five project parcels into the Renewable Energy/Geothermal (REG) Overlay Zone (A-2-REG). Additionally, the project applicant and is requesting approval of a CUP by the County to allow for the construction and operation of the proposed solar energy facility with an integrated battery storage system. The The project site is currently located within, and adjacent to not located adjacent to an existing RE Overlay Zone; and meets the adjacency criteria as the project site is not located in a sensitive area, and would not result in any significant impacts with the implementation of proposed mitigation. therefore, tThe project will need to also meets the criteria

identified for the "Island Overlay" to obtain approval of an amendment to the RE Overlay Zone. Table 3.11-3 provides an analysis of the project's consistency with the "Island Overlay" criteria.

With approval of the General Plan Amendment and Zone Change, the project applicant will be able to request for approval of a CUP to allow the construction and operation of the proposed solar facility.

Table 3.11-3. Project Consistency with "Island Overlay" Criteria

Criteria	Criteria Met?		
Is located adjacent (sharing a common boundary) to an existing transmission source?	There are existing IID power poles along N Best Avenue and Andre Road. As described in Chapter 2, the project includes a gen-tie line that would connect to the IID's existing North Brawley Geothermal Power Plant substation, located west of the project site's southern boundary at Hovley Road and Andre Road. The gen-tie route would be approximately 1.8 miles.		
Consists of the expansion of an existing renewable energy operation?	As described in Chapter 2, the project includes a gentie line that would connect to the IID's existing North Brawley Geothermal Power Plant substation, located west of the project site's southern boundary at Hovley Road and Andre Road. The gen-tie route would be approximately 1.8 miles.		
	The proposed project would be capable of generating up to 40 MW of solar energy, thereby expanding renewable energy generation in the area.		
Would not result in any significant environmental impacts?	As detailed in Sections 3.2 through 3.15 of this EIR, no unavoidable or unmitigable significant impacts were identified. Where significant impacts have been identified, mitigation measures are proposed, that when implemented, would reduce the impact level to less than significant. Therefore, the proposed project would not result in a residual significant impact.		

EIR = environmental impact report; MW = megawatt; RE = renewable energy

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County of Imperial Land Use Ordinance

Development of the solar energy facility and supporting infrastructure is subject to the County's zoning ordinance. The solar energy facility is located on five privately-owned legal parcels zoned A-2-G. Pursuant to Title 9, Division 5, Chapter 8 the following uses are permitted in the A-2 zone subject to approval of a CUP from Imperial County: solar energy electrical generator, battery storage facility, and facilities for the transmission of electrical energy (County of Imperial 2020). Therefore, with approval of a CUP, the proposed project would not conflict with the County's zoning ordinance.

Imperial County Airport Land Use Compatibility Plan

As previously discussed above, the project site is located approximately 1.5 miles north of the Brawley Municipal Airport. According to Figure 3A (Compatibility Map – Brawley Municipal Airport) of the ALUCP, no portion of the project site is located within the Brawley Municipal Airport land use compatibility zones (County of Imperial 1996). On May 18, 2022, the Imperial County Airport Land Use Commission determined that the proposed project is compatible with the ALUCP. Therefore, the proposed project would not conflict with the Imperial County ALUCP and no significant impact would occur.

Mitigation Measure(s)

No mitigation measures are required.

3.11.4 Decommissioning/Restoration and Residual Impacts

Decommissioning/Restoration

If at the end of the PPA term, no contract extension is available for a power purchaser, no other buyer of the energy emerges, or there is no further funding of the project, the project will be decommissioned and dismantled. No impacts on land use and planning are anticipated to occur during decommissioning and restoration of the project site. Decommissioning and restoration would not physically divide an established community or conflict with any applicable land use plan, policy, or regulation. Through the project's decommissioning and subsequent restoration to pre-project conditions, the uses of the project site (agricultural) would remain consistent with the General Plan and zoning designations of the site, which allow agricultural uses. Therefore, no impact is identified and no mitigation is required.

Residual

With mitigation as prescribed in other sections of this EIR, issues related to the conversion of Important Farmland to non-agricultural use would be mitigated and reduced to a less than significant level. Similarly, with the approval of a CUP and reclamation plan to address post-project decommissioning, the project would generally be consistent with applicable federal, state, regional, and local plans and policies. Based on these circumstances, the project would not result in any residual significant and unmitigable land use impacts.

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3.12 Public Services

This section includes an evaluation of potential impacts for identified public services that could result from implementation of the proposed project. Public services typically include fire protection, law enforcement, schools, and other public facilities such as parks, libraries, and post offices. Each subsection includes descriptions of existing facilities, service standards, and potential environmental impacts resulting from implementation of the proposed project, and mitigation measures where appropriate. Section 3.15, Utilities/Service Systems, of this EIR evaluates impacts related to water supply, wastewater, and other utilities. The impact assessment provides an evaluation of potential adverse effects to public services based on criteria derived from the CEQA Guidelines in conjunction with actions proposed in Chapter 2, Project Description.

The IS/NOP prepared for this EIR determined that the project would not result in impacts on schools, parks and other public facilities (libraries and post offices). Therefore, these issue areas will not be discussed further and are included in Chapter 6, Effects Found Not Significant, of this EIR. The IS/NOP is included in Appendix A of this EIR.

3.12.1 Existing Conditions

The project site is located in unincorporated County, approximately one mile north from the City of Brawley's jurisdictional limit. The project site is located within the Imperial County Fire Department (ICFD)/Office of Energy Services (OES) and the Imperial County Sheriff Department's areas of service.

Fire Protection Services

The project site is located within the ICFD/OES area of service. ICFD/OES currently has nine fire stations and six contracting agencies serving the entire 4,500 square miles of unincorporated Imperial County. The nine ICFD stations are located in the communities of Heber, Seeley, Ocotillo, Palo Verde, Niland, Winterhaven, Salton City, and the City of Imperial (ICFD 2019). Each of the county fire stations is staffed with a Captain, Firefighter, and Reserve Firefighter with the only exception being the Palo Verde station that is staffed with a Firefighter and Reserve Firefighter. Every fire station has a Type I engine as its primary apparatus. The City of Imperial and Heber stations also house a Ladder Truck along with the Type I engine. The Seeley and Heber stations also house Type III engines. The ICFD Emergency Units strive to respond immediately after receiving the initial tone for service. The actual response time would be determined by the area of response throughout the vast response area covered.

The closest fire station to the project is site is the Imperial station located at 2514 La Brucherie Road in Imperial, California. This station is located approximately 13.5 miles southwest of the project site.

Police Protection Services

Imperial County's Sheriff's Department is responsible for police protection services in the unincorporated areas of Imperial County and the City of Holtville. The patrol function is divided between North County Patrol, South County Patrol, East County Operations, and City of Holtville. Deputies assigned to the Patrol Divisions are the "first responders" to a call for law enforcement service. The main patrol station is located in El Centro on Applestill Road. Sheriff substations are located in the communities of Brawley, Niland, Salton City, and Winterhaven with resident deputies

located in the unincorporated community of Palo Verde. Under an existing mutual aid agreement, additional law enforcement services would be provided if and when required by all of the cities within the county, as well as with Border Patrol and the California Highway Patrol. The California Highway Patrol provides traffic regulation enforcement, emergency accident management, and service and assistance on state roadways and other major roadways in the unincorporated portions of Imperial County.

The closest sheriff's station to the project site is located at 220 Main St #207 in Brawley, California. This station is approximately 3 miles southwest of the project site.

3.12.2 Regulatory Setting

This section identifies and summarizes federal, state, and local laws, policies, and regulations that are applicable to the project.

State

Fire Codes and Guidelines

The California Fire Code (Title 24, Part 9 of the CCR) establishes regulations to safeguard against hazards of fire, explosion, or dangerous conditions in new and existing buildings, structures, and premises. The Fire Code also establishes requirements intended to provide safety and assistance to firefighters and emergency responders during emergency operations. The provisions of the Fire Code apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal, and demolition of every building or structure throughout the State of California. The Fire Code includes regulations regarding fire resistance-rated construction, fire protection systems such as alarm and sprinkler systems, fire services features such as fire apparatus access roads, means of egress, fire safety during construction and demolition, and wildland-urban interface areas.

Local

Imperial County General Plan

The Imperial County General Plan Seismic and Public Safety Element contains goals and objectives that relate to fire protection and law enforcement pertinent to the proposed project. An analysis of the project's consistency with the applicable goals and objectives of the Seismic and Public Safety Element is provided in Table 3.12-1.

Table 3.12-1. Project Consistency with Applicable General Plan Seismic and Public Safety Element

Applicable General Plan Goals/Policies	Consistency Determination	Analysis
Goal 1: Include public health and safety considerations in land use planning.	Consistent	The project's CUP application and site plan will be reviewed by the Imperial County Fire Department to ensure that the facility complies with state and local fire codes and fire safety features are met. Additionally, the project applicant has included site design measures that

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Table 3.12-1. Project Consistency with Applicable General Plan Seismic and Public Safety Element

Applicable General Plan Goals/Policies	Consistency Determination	Analysis
Objective 1.8: Reduce fire hazards by the design of new developments		meet the County Fire Department's standards which would reduce the potential for fire hazards. This includes constructing a secondary emergency access road, providing all-weather surface roads, and locked gates that can be opened by any emergency responders.
Goal 2: Minimize potential hazards to public health, safety, and welfare and prevent the loss of life and damage to health and property resulting from both natural and human-related phenomena.	Consistent	See response above for a discussion on how the project would implement all state and local fire codes and provide site design measures to reduce the potential for fire hazards. With regards
Objective 2.5: Minimize injury, loss of life, and damage to property by implementing all state codes where applicable.		to public safety and security, the project would include 6-foot tall perimeter security fencing with barbed wire and a motion detection system and closed-circuit camera system. In addition, the points of ingress/egress would be accessed via locked gates that can be opened by any emergency responders.

Source: ICPDS 1997

CUP = conditional use permit

Imperial County Office of Emergency Services – Multi-Hazard Mitigation Plan

The ICFD is the local Office of Emergency services in Imperial County. Imperial County has developed the multi-jurisdictional hazard mitigation plan (MHMP) to create a safer community. The purpose of the MHMP is to significantly reduce deaths, injuries, and other disaster losses caused by natural and human-caused hazards in Imperial County. The MHMP describes past and current hazard mitigation activities and outlines goals, strategies, and actions for reducing future disaster losses. The Imperial County MHMP is the representation of the County's commitment to reduce risks from natural and other hazards and serves as a guide for decision-makers as they commit resources to reducing the effects of natural and other hazards. The jurisdictions included in the MHMP include the cities of Brawley, Calexico, Calipatria, El Centro, Holtville, Imperial, and Westmoreland, the IID and the Imperial County Office of Education. The MHMP complies with all federal, state, and local laws guiding disaster management.

County Evacuation Plans

The Imperial County Emergency Operations Plan (EOP) provides guidance and procedures for the County to prepare for and respond to emergencies. The EOP designates the Sheriff's Department as having jurisdiction in an emergency involving evacuation within the unincorporated areas of the county and within contract cities.

3.12.3 Impacts and Mitigation Measures

This section presents the significance criteria used for considering project impacts related to public services, the methodology employed for the evaluation, an impact evaluation, and mitigation requirements, if necessary.

Thresholds of Significance

Based on CEQA Guidelines Appendix G, project impacts related to public services are considered significant if the project would result in 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:

- Fire protection
- Police protection
- Schools
- Parks
- Other public facilities

As mentioned previously, it was determined through the preparation of an IS/NOP that the project would not result in impacts on schools, parks, or other public facilities. Therefore, those issue areas will not be discussed further and are included in Chapter 6, Effects Found Not Significant, of this EIR.

Methodology

Evaluation of potential fire and police service impacts of the proposed project was based on consultation with the ICFD, Sheriff's Department and review of other development projects in the area.

Impact Analysis

Impact 3.12-1

Would the project result in 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 fire protection?

The project would result in a minor increase in demand for fire protection services over existing levels. No operation and maintenance (O&M) buildings are being proposed. Additional auxiliary facilities would include lighting, grounding, backup uninterruptable power supply (UPS) systems and diesel power generators, fire and hazardous materials safety systems, security systems, chemical safety systems, and emergency response facilities. The project also includes a battery energy storage system (BESS), located near the proposed substation. The proposed project's BESS component would be placed on a 54,000 square-foot concrete pad. The BESS would consist of 12 banks of batteries totaling up to 432 enclosures. Each of the enclosures would utilize self-contained liquid cooling systems and include built-in fire suppression systems.

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The project site is located in the unincorporated area of Imperial County. According to the Seismic and Public Safety Element of the General Plan (County of Imperial 1997), the potential for a major fire in the unincorporated areas of the County is generally low. As discussed in Chapter 2, Project Description, primary access to the project site would be located off N Best Avenue. A secondary emergency access road would be located in the northwest portion of the project site. An all-weather surface access road would surround the perimeter of the project site, as well as around solar blocks no greater than 500 by 500 feet. Points of ingress/egress would be accessed via locked gates that can be opened by any emergency responders. Although the proposed project would be designed, constructed, and operated in accordance with applicable fire protection and other environmental, health, and safety requirements (e.g., CPUC safety standards), the project applicant will be required to consult and coordinate with the Fire Department to address any fire safety and service concerns (i.e, BESS) so that adequate service is maintained. While the proposed project may result in an increase in demand for fire protection service, with installation of internal fire prevention systems and ICFD consultation, the project would not result in an increase in demand that would, in turn, result in a substantial adverse physical impact associated with the provision of new or physically altered fire protection 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. Based on these considerations, the project would not result in a need for fire facility expansion and a less than significant impact would occur.

Imperial County requires payment of impact fees for new development projects. Fire Impact Fees are imposed pursuant to Ordinance 1418 §2 (2006), which was drafted in accordance with the County's TischlerBise Impact Fee Study. The ordinance has provisions for non-residential industrial projects based on square footage. The project applicant will be required to pay the fire protection services' impact fees. These fees would be included in the Conditions of Approval for the CUP. No new fire stations or facilities would be required to serve the project. Impacts would therefore be less than significant.

Mitigation Measure(s)

No mitigation measures are required.

Impact 3.12-2

Would the project result in 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 police protection?

The project does not include a residential component; therefore, it would not result in a substantial addition of residents to the Sheriff Department's service area. Although the potential is low, the proposed project may attract vandals or other security risks and the increase in construction related traffic could increase demand on law enforcement services. Six-foot high chain link fencing topped with barbed wire would be installed around the perimeter of the project site at the commencement of construction and site access would be limited to authorized site workers. Points of ingress/egress would be accessed via locked gates. In addition, a motion detection system and closed-circuit camera system may also be installed. The site would be remotely monitored 24 hours per day, 7 days per week. In addition, periodic on-site personnel visitations for security would occur during operations and maintenance of the proposed project, thereby minimizing the need for police surveillance.

The proposed project may result in a temporary increase in demand for law enforcement service due to the presence of construction equipment and material being stored on-site. With installation of the proposed security features on the project site, the proposed project would not result in an increase in demand that would, in turn, result in a substantial adverse physical impact associated with the provision of new or physically altered sheriff 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. As conditions of approval of the project, the project applicant will be required to participate in the Imperial County Public Benefit Program for the life of this CUP and shall at all times be a party to a public benefit agreement in a form acceptable to County Counsel in order to pay for all costs, benefits, and fees associated with the approved project, and the applicant will be required to reimburse the Sheriff's Department for any investigations regarding theft on the project site and related law enforcement. Approval of this public benefit agreement will be by the Board of Supervisors prior to the issuance of the first building permit. These potential impacts are less than significant.

Mitigation Measure(s)

No mitigation measures are required.

3.12.4 Decommissioning/Restoration and Residual Impacts

Decommissioning/Restoration

If at the end of the PPA term, no contract extension is available for a power purchaser, no other buyer of the energy emerges, or there is no further funding of the project, the project will be decommissioned and dismantled. Decommissioning and restoration of the project site would occur and would not result in an increased need for fire and police protection services. Decommissioning of the project would occur through implementation of a required Reclamation Plan. These activities would be in the form of disassembling project components, including the BESS, and then restoring the site to pre-project conditions, both of which would not create an increase in demand for police or fire service beyond the level required for the proposed solar operations. Therefore, no impact is identified and no mitigation is required for this phase.

Residual

With payment of the development impact fees for fire and police protection services, project impacts would be less than significant. No mitigation is required, and no residual significant and unmitigated impacts would result.

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3.13 Transportation

This section addresses the proposed project's impacts on traffic and the surrounding roadway network associated with construction and operation of the proposed project. The following discussion describes the existing conditions in the surrounding area, the existing federal, state, and local regulations regarding transportation, and an analysis of the potential impacts of the proposed project.

Information in this section is summarized from the *Traffic Letter Report – Brawley Solar Project* prepared by Linscott, Law & Greenspan (LLG). This report is included in Appendix G of this EIR.

3.13.1 Existing Conditions

Existing Circulation Network

The following is a description of the nearby roadway network:

North Best Avenue is an unclassified roadway in the Imperial County Circulation Element Plan. It is currently constructed as a two-lane north-south roadway in the study area. There is no posted speed limit. There are no bike lanes provided.

Ward Road is an unclassified roadway in the Imperial County Circulation Element Plan. It is currently constructed as a two-lane east-west roadway in the study area. There is no posted speed limit. There are no bike lanes provided.

State Route 111 (SR-111) begins at the International Border between Mexico and the United States traveling north with two travel lanes in each direction. SR 111 (Imperial Avenue) is classified as a 4-Lane primary north/south arterial in the City of Calexico Circulation Element. Class II bicycle lanes are provided north of SR 98. Bus stops are not provided. Curb, gutter, and sidewalks are provided south of SR 98. Curbside parking is permitted intermittently south of SR 98, on both sides of the roadway. The speed limit is posted at 55 mph.

Alternative/Public Transportation

Fixed Route Transportation

Imperial Valley Transit (IVT) is an inter-city fixed route bus system, subsidized by the Imperial Valley Association of Governments (IVAG), administered by the County Department of Public Works and operated by a public transit bus service. The service is wheelchair accessible and Americans with Disabilities Act compliant. IVT Routes are defined categorized in the following manner:

- **Fixed Routes.** Fixed routes operate over a set pattern of travel and with a published schedule. The fixed route provides a low cost, reliable, accessible and comfortable way to travel.
- Deviated Fixed Route. In several service areas, IVT operates on a deviated fixed route basis
 so that persons with disabilities and limited mobility are able to travel on the bus. Passengers
 must call and request this service the day before service is desired in the communities of
 Seeley, Ocotillo and the east side of the Salton Sea.
- Remote Zone Routes. Remote zone route operate once a week. These routes are "lifeline" in nature in that they provide connections from some of the more distant communities in the Imperial County area (IVT 2021).

The project site is not within the Fixed Route Transportation system and, therefore, would not receive regular bus service to the project site or within the vicinity of the project site. The IVT Gold Line serves the Brawley area with 31 bus stops. The nearest IVT bus stop is located at Flammang Avenue and Gutierrez Court, which is approximately two miles southwest of the project site.

Bicycle Facilities

The project site is located within a rural portion of Imperial County. There are no bicycle facilities in the immediate proximity of the project site.

Project Site Access

Regional access to the site would be provided by SR-78 and SR-111. As shown in Figure 2-3, primary access to the project site would be located off N Best Avenue. A secondary emergency access road would be located in the northwest portion of the project site.

3.13.2 Regulatory Setting

This section identifies and summarizes laws, policies, and regulations that are applicable to the proposed project.

State

Senate Bill 743

In September 2013, the Governor's Office signed Senate Bill 743 into law, starting a process that fundamentally changes the way transportation impact analysis is conducted under CEQA. Within the State's CEQA Guidelines, these changes include the elimination of Auto Delay, level of service (LOS), and similar measurements of vehicular roadway capacity and traffic congestion as the basis for determining significant impacts. The guidance identifies vehicle miles traveled (VMT) as the most appropriate CEQA transportation metric, along with the elimination of Auto Delay/LOS for CEQA purposes statewide. The justification for this paradigm shift is that Auto Delay/LOS impacts lead to improvements that increase roadway capacity and therefore induce more traffic and greenhouse gas emissions.

California Department of Transportation

Caltrans manages more than 50,000 miles of California's highway and freeway lanes, provides inter-city rail services, permits more than 400 public-use airports and special-use hospital heliports, and works with local agencies. Specifically, Caltrans is responsible for the design, construction, maintenance, and operation of the California State Highway System.

As it relates to the proposed project and potential construction access routes within the County, Caltrans District 11 is responsible for maintaining and managing I-8, SR-78 and SR-111.

Regional

Southern California Association of Governments (SCAG) 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) (Connect SoCal)

On September 3,2020, SCAG adopted the 2020-2045 RTP/SCS (SCAG 2020). The RTP/SCS is a long-range visioning plan that balances future mobility and housing needs with economic,

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environmental and public health goals. Input from local governments, county transportation commissions, tribal governments, non-profit organizations, businesses, and local stakeholders within the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura. The 2020-2045 RTP/SCS demonstrates how the region will reduce emissions from transportation sources to comply with SB 375 and meet the NAAQS set forth by the Clean Air Act.

The updated RTP/SCS contains thousands of individual transportation projects that aim to improve the region's mobility and air quality and revitalize the economy. Since the RTP/SCS's adoption, the county transportation commissions have identified new project priorities and have experienced technical changes that are time-sensitive. Additionally, the new amendments for the plan have outlined minor modifications to project scopes, costs and/or funding and updates to completion years. The amendments to the RTP/SCS do not change any other policies, programs, or projects in the plan.

Local

County of Imperial Circulation and Scenic Highways Element

The Circulation and Scenic Highways Element identifies the location and extent of transportation routes and facilities. It is intended to meet the transportation needs of local residents and businesses and as a source for regional coordination. The inclusion of Scenic Highways provides a means of protecting and enhancing scenic resources within highway corridors in Imperial County. The purpose of the Circulation and Scenic Highways Element is to provide a comprehensive document which contains the latest knowledge about the transportation needs of the County and the various modes available to meet these needs. Additionally, the purpose of this Element is to provide a means of protecting and enhancing scenic resources within both rural and urban scenic highway corridors.

Coordination across jurisdictional standards for road classification and design standards was identified as a crucial component to the 2008 update of the Circulation and Scenic Highways Element. The intent of this element is to provide a system of roads and streets that operate at a LOS "C" or better (County of Imperial 2008).

County of Imperial Bicycle Master Plan Update: Final Plan

In 2012, the County of Imperial adopted an updated Bicycle Master Plan to serve as the guiding document for the development of an integrated network of bicycle facilities and supporting programs designed to link the unincorporated areas and attractive land uses throughout the County. This document is an update to the previously adopted Countywide Bicycle Master Plan; and was prepared to accomplish the following goals:

- 1. To promote bicycling as a viable travel choice for users of all abilities in the County
- To provide a safe and comprehensive regional connected bikeway network
- 3. To enhance environmental quality, public health, recreation and mobility benefits for the County through increased bicycling

The County of Imperial's General Plan, Circulation and Scenic Highways Element, and Conservation and Open Space Element, provide a solid planning basis for the Bicycle Master Plan. In spite of the fact that there are a limited number of bicycle facilities in Imperial County and no comprehensive bicycle system, there is a growing interest in cycling and numerous cyclists bike on a regular basis for both recreation and commuting to work and school.

3.13.3 Impacts and Mitigation Measures

Thresholds of Significance

Based on CEQA Guidelines Appendix G, project impacts related to transportation are considered significant if any of the following occur:

- Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities
- Conflict with or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)
- Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)
- Result in inadequate emergency access

Methodology

The assessment evaluates the proposed project's trip generated during and after construction, and roadway conditions for roads that would be utilized to access the project site for construction.

Project Trip Generation

Construction of the proposed project would occur in phases beginning with site preparation and grading and ending with equipment setup and commencement of commercial operations. During peak construction activities, 120 workers and a maximum of 60 trucks at a time would be required.

Daily and peak hour trip generation rates and in/out splits were calculated for the peak construction period using detailed data developed for analysis of the project's impacts. Construction activities would generally occur during a 12-hour-shift day. A worst-case scenario in which all employees would arrive prior to the morning peak commuter period (7:00-9:00 a.m.) and depart within the evening peak period (4:00-6:00 p.m.) was assumed. Truck trips are anticipated to be distributed generally evenly throughout the 12-hour-shift day. In order to provide a conservative analysis, all employees were assumed to arrive and depart during peak commute periods. In addition, no carpooling for construction employees was assumed.

A passenger-car-equivalent (PCE) factor of 2.5 was applied to heavy vehicles (per the Highway Capacity Manual or HCM) to account for their reduced performance characteristics in the traffic stream (e.g. starting, stopping, and maneuvering). This information was used in calculating the project-generated average daily traffic (ADT).

Table 3.13-1 tabulates the total daily and peak hour project traffic volumes. The project's construction trip generation is calculated to be 540 ADT with 127 inbound/19 outbound trips during the AM peak hour and 19 inbound/ 127 outbound trips during the PM peak hour. These values include the heavy-vehicle PCE-adjustment.

Once fully constructed, the project would be operated on an unstaffed basis and be monitored remotely from the existing Brawley Geothermal Power Plant control room, with periodic on-site personnel visitations for security, maintenance and system monitoring. Therefore, no full-time site personnel would be required on-site during operations and approximately two employees would only be onsite up to four times per year to wash the solar panels.

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Table 3.13-1. Construction Project Trip Generation

Use	Size	PCE ^b	Daily Trips		AM Pea	ak Hour	PM Pea	ak Hour
					Vol	ıme	Vol	ume
			Rate (In + Out)	Volume (ADT) ^a	ln	Out	In	Out
Personnel	120	1	2.0/personnel	240	114	6	6	114
Trucks	60	2.5	2.0/truck	300	13	13	13	13
Subtotal				540	127	19	19	127

Notes: a – ADT = Average daily traffic; b – PCE = Passenger car equivalent

Impact Analysis

Impact 3.13-1 Would the project conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

During the construction phase of the proposed project, the maximum number of trip ends generated on a daily basis would be approximately 540 trips. Based on the low amount of construction trips generated and low existing traffic volumes on area roadways, no substantial transportation impacts are anticipated. Implementation of the proposed project would not require any public road widening to accommodate vehicular trips associated with the proposed project (construction phase and operational phase), while maintaining adequate LOS. Additionally, future operations and maintenance would be conducted remotely, with minimal trips to the project site for panel washing and other solar maintenance. Approximately two employees would be onsite up to four times per year to wash the solar panels, which equates to 8 trips per employee or 16 trips annually. There is no regular bus service to the general area and project-related construction and operations and maintenance phases would not impact mass transit. The proposed project would not interfere with bicycle facilities because the proposed project is located in a rural portion of the County with no existing or potential future designated bike routes in the immediate vicinity. Therefore, the proposed project would not result in any significant impacts to any roadway segments or transportation related facilities/infrastructure within the project area during construction and operation; and would not conflict with a program plan, ordinance, or policy as it relates to traffic and transportation. Impacts are considered less than significant.

Mitigation Measure(s)

No mitigation measures are required.

^{1.} To estimate the employee traffic, it is conservatively assumed that 100% of the employee traffic would access the work area during the same commuter peak hours between 7:00 - 9:00 a.m. & 4:00 - 6:00 p.m.

^{2.} The In/Out splits assumed are 95:5 during AM peak hour and 5:95 during the PM peak hour.

^{3.} Truck trips are estimated to occur relatively evenly throughout a 12-hour construction hours proposed for the project. For 30 trucks, this calculates to approximately 2.3 trucks/hour without PCE.

^{4.} A passenger-car-equivalent (PCE) factor of 2.5 was applied to heavy vehicles (per the Highway Capacity Manual or HCM) Source: Appendix G of this EIR

Impact 3.13-2 Would the project conflict with or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?

Section 15064.3(b) of the CEQA Guidelines provides guidance on determining the significance of transportation impacts and focuses on the use of vehicle miles traveled (VMT), which is defined as the amount and distance of automobile travel associated with a project.

Although the proposed project would increase VMT during the construction phase as a result of trips made by construction workers and transportation of construction material and equipment, these increases are temporary in nature. Further, as discussed above, operation of the proposed project would only require intermittent maintenance (including inspection, panel washing, and vegetation removal), which would be a nominal amount of vehicle trips generated (16 trips annually). Therefore, the proposed project would not conflict or be inconsistent with Section 15064.3(b) of the CEQA Guidelines and this impact is considered less than significant.

Mitigation Measure(s)

No mitigation measures are required.

Impact 3.13-3 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)?

Project construction would include the renovation of existing dirt roads to all-weather surfaces (to meet the County standards) from N Best Avenue to the City of Brawley wastewater treatment plant. Construction of the proposed project would begin with clearing of existing brush and installation of fencing around the project boundary. A 20-foot road of engineering-approved aggregate would surround the site within the fencing.

As shown in Figure 2-3, primary access to the project site would be located off N Best Avenue. A secondary emergency access road would be located in the northwest portion of the project site. Access roads would be constructed with an all-weather surface, to meet the County Fire Department's standards. An all-weather surface access road would surround the perimeter of the project site, as well as around solar blocks no greater than 500 by 500 feet.

At the time of final design for the proposed project, and as a Condition of Approval of the proposed project, the applicant will submit a final Haul Route Study that identifies what road improvements, if any, are requested by Department of Public Works and a cost estimate. The applicant would work with the Department of Public Works to address the appropriate improvements and Applicant's responsibility for the cost of improvements, if required. The Haul Route Study would include the following components:

- 1. Pictures and/or other documents to verify the existing conditions of the roads proposed to be utilized for haul routes
- The Haul Route Study shall evaluate the impact to the roads and access points listed above, and provide recommendations on improvements, as well as quantity and cost estimates for such improvements

The County Department of Public Works will require a Roadway Maintenance Agreement, and that the application provide financial security to maintain the road on the approved Haul Route Study during construction. The Applicant would be responsible to repair any damages caused by construction traffic

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during construction and maintain them in safe conditions. The use of the proposed access roads are not otherwise anticipated to increase hazards because of design features or incompatible uses and no significant impact is identified.

Mitigation Measure(s)

No mitigation measures are required.

Impact 3.13-4 Would the project result in inadequate emergency access?

PV panels would be spaced to maintain proper clearance for emergency access. Internal access roads would be constructed along the perimeter fence and solar panels to facilitate vehicle access and maneuverability for emergency unit vehicles. Access roads would be constructed with an all-weather surface, to meet the County Fire Department's standards. The access roads would also have turnaround areas at any dead-end to allow clearance for fire trucks per fire department standards. Based on this context, impacts on this issue area are considered less than significant.

Mitigation Measure(s)

No mitigation measures are required.

3.13.4 Decommissioning/Restoration and Residual Impacts

Decommissioning/Restoration

If at the end of the PPA term, no contract extension is available for a power purchaser, no other buyer of the energy emerges, or there is no further funding of the project, the project will be decommissioned and dismantled. As presented above, construction traffic would not result in a significant impact on any of the project area roadway segments, intersections, and freeway segments because of the low volume of traffic. A similar scenario would occur during the decommissioning and site restoration stage for the proposed project. ADT would be similar to or less than the ADT required for construction. Similarly, the decommissioning activities would not result in a significant impact related to possible safety hazards, or possible conflicts with adopted policies, plans, or programs as the decommissioning and subsequent restoration would revert the project site to pre-project conditions. Therefore, decommissioning and restoration of the project site would not generate traffic resulting in a significant impact on the circulation network. A less than significant impact is identified and no mitigation is required.

Residual

The construction and operation of the proposed project would not result in direct impacts on intersections, roadway segments, and freeway segments. Therefore, less than significant impacts have been identified. No mitigation is required and no residual unmitigated impacts would occur with implementation of the proposed project.

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3.14 Tribal Cultural Resources

This section discusses tribal cultural resources that may be potentially impacted by the proposed project. The following identifies the existing cultural resources within the project site, analyzes potential impacts of the proposed project, and recommends mitigation measures to avoid or reduce potential impacts of the proposed project.

Information for this section is summarized from the *Archaeological and Paleontological Assessment Report for the Brawley Solar Project* prepared by Chambers Group, Inc. This report is included in Appendix E of this EIR.

3.14.1 Existing Conditions

Tribal cultural resources are defined as sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either included or determined to be eligible for inclusion in the California Register of Historical Resources (CRHR); or included in a local register of historical resources; or a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant. Historical resources, unique archaeological resources, or non-unique archaeological resources may also be tribal cultural resources if they meet these criteria (PRC Section 21074).

Tribal Cultural Setting

See Section 3.6, Cultural Resources of this EIR and the *Archaeological and Paleontological Assessment Report for the Brawley Solar Project* (Appendix E of this EIR) for a description of the regional ethnohistory.

Sacred Lands File Results

The California Native American Heritage Commission (NAHC) identifies, catalogs, and protects Native American cultural resources on private and public lands in California. Cultural resources include graves, cemeteries, and places of special religious or social significance to Native Americans. The NAHC also records the historical territories of state recognized tribes into a database called the Sacred Lands File (SLF). A records search of the SLF is conducted to ensure that the tribes potentially affected by a project are properly notified and consulted.

A SLF search request was submitted on October 2, 2020 to the California NAHC. The search results were received on October 28, 2020, and were positive. The NAHC response provided contact information for Native American tribes that may have information on cultural resources on the project site.

Tribal Notification

Pursuant to Assembly Bill (AB) 52, California Native American tribes traditionally and cultural affiliated with the project area can request notification of projects in their traditional cultural territory. The NAHC enclosed a list of Native American groups and individuals who may be able to provide information about Native American cultural resources in the vicinity of the project site.

Pursuant to Senate Bill (SB) 18, prior to the approval or any amendment of a general plan or specific plan, a local government must notify the appropriate tribes (on the contact list maintained by the NAHC) of the opportunity to conduct consultations for the purpose of preserving, or mitigating impacts on, cultural places on land within the local government's jurisdiction that is affected by the proposed plan adoption or amendment.

In accordance with AB 52 and SB18, the County provided notification of the proposed project to the following Native American tribes via certified mail on August 4, 2021:

- Barona Group of the Capitan Grande
- Campo Band of Diegueno Mission Indians
- Ewiiaapaayp Band of Kumeyaay Indians
- lipay Nation of Santa Ysabel
- Inja-Cosmit Band of Indians
- Jamul Indian Village
- Kwaaymii Laguna Band of Mission Indians
- La Posta Band of Diegueno Mission Indians
- Manzanita Band of Kumeyaay Nation
- Mesa Grande Band of Diegueno Mission Indians
- Quechan Tribe of the Fort Yuma Reservation
- San Pasqual Band of Diegueno Mission Indians
- Sycuan Band of Kumeyaay Nation
- Viejas Band of Kumeyaay Indians

The County requested for tribes to provide any information regarding any Traditional Cultural Properties, Sacred Sites, resource collecting areas, or any other areas of concern known to occur in the project area. No tribes have responded that indicate the potential for traditional cultural properties or sacred sites.

3.14.2 Regulatory Setting

This section identifies and summarizes federal, state, and local laws, policies, and regulations that are applicable to the project.

Federal

Native American Graves Protection and Repatriation Act (1990); Title 25, United States Code Section 3001, et seq.

The Native American Graves Protection and Repatriation Act defines "cultural items," "sacred objects," and "objects of cultural patrimony;" establishes an ownership hierarchy; provides for review; allows excavation of human remains, but stipulates return of the remains according to ownership; sets penalties; calls for inventories; and provides for the return of specified cultural items.

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State

Assembly Bill 52

AB 52 amends PRC 5097.94, and adds eight new sections to the PRC relating to Native Americans. AB 52 was passed in 2014 and took effect on July 1, 2015. It establishes a new category of environmental impacts that must be considered under CEQA called tribal cultural resources (PRC 21074) and establishes a process for consulting with Native American tribes and groups regarding potential impacts to tribal resources. Under AB 52, a project that may substantially change the significance of a tribal cultural resource is a project that may have a significant impact on the environment. If a project may cause a significant impact on a tribal cultural resource, the lead agency shall implement measures to avoid the impacts when feasible.

Senate Bill 18

SB 18 requires local governments to consult with tribes prior to making certain planning decisions and to provide notice to tribes at certain key points in the planning process. These consultation and notice requirements apply to approvals and amendments of both general plans (defined in Government Code §65300 et seq.) and specific plans (defined in Government Code §65450 et seq.).

Prior to the approval or any amendment of a general plan or specific plan, a local government must notify the appropriate tribes (on the contact list maintained by the NAHC) of the opportunity to conduct consultations for the purpose of preserving, or mitigating impacts on, cultural places on land within the local government's jurisdiction that is affected by the proposed plan adoption or amendment. Tribes have 90 days from the date on which they receive notification to request consultation, unless a shorter timeframe has been agreed to by the tribe (Government Code §65352.3).

Public Resources Code Section 21074

PRC Section 21074 defines a tribal cultural resource as a site, feature, place, cultural landscape, sacred place, and any object with cultural value to a California Native American Tribe. A tribal cultural resource must be on or eligible for the CRHR or must be included in a local register of historical resources. The lead agency can determine if a tribal cultural resource is significant even if it has not been evaluated for the CRHR or is not included on a local register.

Assembly Bill 4239

AB 4239, passed in 1976, established the NAHC as the primary government agency responsible for identifying and cataloging Native American cultural resources. The bill authorized the Commission to act in order to prevent damage to and insure Native American access to sacred sites and authorized the Commission to prepare an inventory of Native American sacred sites located on public lands.

Public Resources Code Section 21074

PRC Section 21074 defines a tribal cultural resource as a site, feature, place, cultural landscape, sacred place, and any object with cultural value to a California Native American Tribe. A tribal cultural resource must be on or eligible for the CRHR or must be included in a local register of historical resources. The lead agency can determine if a tribal cultural resource is significant even if it has not been evaluated for the CRHR or is not included on a local register.

Public Resources Code 5097.97

No public agency and no private party using or occupying public property or operating on public property under a public license, permit, grant, lease, or contract made on or after July 1, 1977, shall in any manner whatsoever interfere with the free expression or exercise of Native American religion as provided in the U.S. Constitution and the California Constitution; nor shall any such agency or party cause severe or irreparable damage to any Native American sanctified cemetery, place of worship, religious or ceremonial site, or sacred shrine located on public property, except on a clear and convincing showing that the public interest and necessity so require.

Public Resources Code 5097.98 (b) and (e)

PRC 5097.98 (b) and (e) require a landowner on whose property Native American human remains are found to limit further development activity in the vicinity until he/she confers with the NAHC-identified most likely descendants (MLD) to consider treatment options. In the absence of MLDs or of a treatment acceptable to all parties, the landowner is required to reenter the remains elsewhere on the property in a location not subject to further disturbance.

California Health and Safety Code, Section 7050.5

California HSC 7050.5 makes it a misdemeanor to disturb or remove human remains found outside a cemetery. This code also requires a project owner to halt construction if human remains are discovered and to contact the County Coroner.

3.14.3 Impacts and Mitigation Measures

This section presents the significance criteria used for considering project impacts related to tribal cultural resources, the methodology employed for the evaluation, an impact evaluation, and mitigation requirements, if necessary.

Thresholds of Significance

Based on CEQA Guidelines Appendix G, project impacts related to tribal cultural resources are considered significant if the project causes a substantial adverse change in the significance of a tribal cultural resource defined in PRC section 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:

- Listed or eligible for listing in the CRHR, or in a local register of historical resources as defined in PRC section 5020.1(k)
- 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 PRC Section
 5024.1. In applying the criteria set forth in subdivision (c) of PRC Section 5024.1, the lead
 agency shall consider the significance of the resource to a California Native American tribe

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Impact Analysis

Impact 3.14-1

Would the project cause a substantial adverse change in the significance of a tribal cultural resource defined in Public Resources Code section 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:

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 section 5020.1(k)

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 Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?

The NAHC maintains the confidential SLF which contains sites of traditional, cultural, or religious value to the Native American community. A SLF search request was submitted on October 2, 2020 to the California NAHC. The search results were received on October 28, 2020 and were positive.

In accordance with AB 52 and SB18, the County provided notification of the proposed project to 14 Native American tribes (see complete list in Section 3.14.1) via certified mail on August 4, 2021. The County requested for tribes to provide any information regarding any Traditional Cultural Properties, Sacred Sites, resource collecting areas, or any other areas of concern known to occur in the project area. No tribes have responded that indicate the potential for traditional cultural properties or sacred sites. Therefore, the project is not anticipated to cause a substantial adverse change in the significance of a tribal cultural resource, defined in PRC section 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 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 PRC Section 5024.1, and, per the criteria set forth in Section 5024.1, considering the significance of the resource to a California Native American tribe. As stated in Section 3.6 Cultural Resources, potential impacts to archaeological resources would be less than significant with implementation of Mitigation Measures CUL-1 through CUL-6. Impacts specifically related to tribal cultural resources would be less than significant.

Mitigation Measure(s)

No mitigation measures are required.

3.14.4 Decommissioning/Restoration and Residual Impacts

Decommissioning/Restoration

If at the end of the PPA term, no contract extension is available for a power purchaser, no other buyer of the energy emerges, or there is no further funding of the project, the project will be decommissioned and dismantled. No grading or significant landform modifications would be required during decommissioning activities upon site restoration in the future. No impact on tribal cultural resources would occur.

Residual

As described above, impacts specifically related to tribal cultural resources would be less than significant. No mitigation is required and no residual unmitigated impacts would occur with implementation of the proposed project.

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3.15 Utilities and Service Systems

This section includes an evaluation of potential impacts for identified Utilities/Service Systems that could result from implementation of the project. Utilities/Service Systems include wastewater treatment facilities, stormwater drainage facilities, water supply and treatment, and solid waste disposal. The impact analysis provides an evaluation of potential impacts to Utilities/Service Systems based on criteria derived from CEQA Guidelines in conjunction with actions proposed in Chapter 2, Project Description. DuBose Design Group prepared the *Water Supply Assessment* (WSA) for the Brawley Solar Energy Facility. This report is included in Appendix H of this EIR.

The IS/NOP prepared for this EIR determined that impacts with regards to solid waste disposal, storm drainage, and wastewater treatment would be less than significant. Therefore, these impacts are not addressed in detail in this EIR; however, the rationale for eliminating these issues is discussed in Chapter 6.0, Effects Found Not Significant.

3.15.1 Existing Conditions

The Imperial Valley area is located within the south-central part of Imperial County and is bound by Mexico on the south, the Algodones Sand Hills on the east, the Salton Sea on the north and San Diego County on the northwest, and the alluvial fans bordering the Coyote Mountains and the Yuha Desert to the southwest. Imperial Valley depends on the Colorado River for its water, which the Imperial Irrigation District (IID) transports, untreated, to delivery gates for agricultural, municipal, industrial (including geothermal and solar energy), environmental (managed marsh), recreational (lakes), and other non-agricultural uses. IID supplies the cities, communities, institutions and Golden State Water (which includes all or portions Calipatria, Niland, and some adjacent Imperial County territory) with untreated water that they treat to meet state and federal drinking water guidelines before distribution to their customers (Appendix H of this EIR).

The project site is located within IID's Imperial Unit and district boundary and as such is eligible to receive water service. IID has adopted an Interim Water Supply Policy (IWSP) for Non-Agricultural Projects, from which water supplies can be contracted to serve new developments within IID's water service area. The IWSP sets aside 25,000 acre-feet annually (AFY) of IID's Colorado River water supply to serve new non-agricultural projects. As of October 2021, a balance of 23,800 acre-feet per year (AFY) remain available under the IWSP for new non-agricultural projects ensuring reasonably sufficient supplies for such projects. Water for the project site will continue to be supplied by the adjacent Best Canal Lateral X through an IWSP Water Supply Agreement with IID to process the untreated Colorado River water for the proposed project. IID delivers untreated Colorado River water to the project site for agricultural uses through the following gates and laterals. The 10-year record for 2011-2020 of water delivery accounting is shown in Table 3.15-1.

Table 3.15-1. Historic 10-Year Historic Delivery (AFY): 2011 through 2020

					, ,	, -				
Canal/Gate	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Best 115	0	0	226.9	412.3	435.8	425.0	307.9	513.8	417.3	317.2
Best 114	0	0	136.9	230.9	259.2	257.0	262.0	340.9	381.1	247.2
Best 113	0	0	111.4	286.1	212.8	223.4	350.5	282.8	197.2	247.5
Best 110	0	0	127.4	161.4	172.6	142.4	121.9	171.0	204.5	163.0
Total	0	0	602.6	1090.7	1080.4	1047.8	1042.3	1308.5	1200.1	974.9

Source: Appendix H of this EIR AF = acre-feet per year

3.15.2 Regulatory Setting

This section identifies and summarizes laws, policies, and regulations that are applicable to the proposed project.

State

Senate Bill 610

With the introduction of SB 610, any project under CEQA shall provide a WSA if:

- The project meets the definition of the Water Code Section 10912:
 - For the purposes of this part, the following terms have the following meanings:
 - (a) "Project" means any of the following:
 - (1) A proposed residential development of more than 500 dwelling units.

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- (2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.
- (3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.
- (4) A proposed hotel or motel, or both, having more than 500 rooms.
- (5) 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.
- (6) A mixed-use project that includes one or more of the projects specified in this subdivision.
- (7) 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.
- (b) If a public water system has fewer than 5,000 service connections, then "project" means any proposed residential, business, commercial, hotel or motel, or industrial development that would account for an increase of 10 percent or more in the number of the public water system's existing service connections, or a mixed-use project that would demand an amount of water equivalent to, or greater than, the amount of water required by residential development that would represent an increase of 10 percent or more in the number of the public water system's existing service connections.

After review of Water Code Section 10912, the solar facility is deemed a "project" because it is a proposed industrial use occupying more than 40 acres of land.

California Water Code

Water Code Sections 10656 and 10657 restrict state funding for agencies that fail to submit their urban water management plan to the Department of Water Resources. In addition, Water Code Section 10910 describes the WSA that must be undertaken for projects referred under PRC Section 21151.9, including an analysis of groundwater supplies. Water agencies are given 90 days from the start of consultation in which to provide a WSA to the CEQA lead agency. Water Code Section 10910 also specifies the circumstances under which a project for which a WSA was once prepared would be required to obtain another assessment. Water Code Section 10631, directs that contents of the urban water management plans include further information on future water supply projects and programs and groundwater supplies.

Water Quality Control Plan for the Colorado River Basin

The Water Quality Control Plan for the Colorado River Basin (or Basin Plan) prepared by the Colorado River RWQCB (Region 7) identifies beneficial uses of surface waters within the Colorado River Basin region, establishes quantitative and qualitative water quality objectives for protection of beneficial uses, and establishes policies to guide the implementation of these water quality objectives.

Local

Imperial Integrated Regional Water Management Plan

The Imperial Integrated Regional Water Management Plan (IRWMP) serves as the governing document for regional water planning to meet present and future water resource needs and demands by addressing such issues as additional water supply options, demand management and determination and prioritization of uses and classes of service provided. In November 2012, the Imperial County Board of Supervisors approved the Imperial IRWMP, and the City of Imperial City Council and the IID Board of Directors approved it in December 2012. Through the IRWMP process, IID presented to the region stakeholders options in the event long-term water supply augmentation is needed, such as water storage and banking, recycling of municipal wastewater, and desalination of brackish water.

Imperial Irrigation District Interim Water Supply Policy for Non-Agricultural Projects

The IWSP was adopted by the IID Board on September 29, 2009. The IWSP provides a mechanism to address water supply requests for projects being developed within the IID service area. The IWSP designates up to 25,000 AFY of IID's annual Colorado River water supply for new non-agricultural projects, provides a mechanism and process to develop a water supply agreement for any appropriately permitted project, and establishes a framework and set of fees to ensure the supplies used to meet new demands do not adversely affect existing users by funding water conservation or augmentation projects, as needed.

Depending on the nature, complexity, and water demands of the proposed project, new projects may be charged a one-time reservation fee and an annual water supply development fee for the contracted water volume used solely to assist in funding new water supply projects. All new industrial use projects are subject to the fee, while new municipal and mixed-use projects shall be subject to the fee if the project water demands exceed certain district-wide average per capita use standards. The applicability of the fee to mixed-use projects will be determined by IID on a case-by-case basis, depending on the proportion of types of land uses and water demand proposed for a project.

Temporary Land Conversion Fallowing Policy

The Temporary Land Conversion Fallowing Policy was adopted by the Board on October 28, 2013, to provide a mechanism for IID to administer apportionment of the district's quantified annual supply of Colorado River water; IID board approved a resolution repealing the Equitable Distribution Plan (EDP) on February 6, 2018.

In order to facilitate new development and economic diversity in Imperial County; as well as ensure that the long-term, temporary, land use designations are conducive to a coordinated land use/water supply policy as envisioned in the Imperial IRWMP the IID Temporary Land Conversion Fallowing Policy was developed. This policy provides a framework for a temporary, long-term fallowing program to work in concert with the IWSP and provides direction for certain private projects that, if implemented, will temporarily remove land from agricultural production within the district's water service area include renewable solar energy and other non-agricultural projects. Such projects may need a short-term water supply for construction and decommissioning activities and longer-term water service for facility operation and maintenance or for treating to potable water standards.

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County of Imperial General Plan

The Imperial County General Plan provides goals, objectives, policies, and programs regarding the preservation and use of water. Table 3.15-2 provides a consistency analysis of the applicable Imperial County General Plan goals and objectives from the Conservation and Open Space Element, and Renewable Energy and Transmission Element, as they relate to the proposed project. While the EIR analyzes the project's consistency with the General Plan pursuant to CEQA Guidelines Section 15125(d), the Imperial County Board of Supervisors ultimately determines consistency with the General Plan.

Table 3.15-2. County of Imperial General Plan Consistency Analysis – Water Service

Applicable General Plan Goals and Policies	Consistency Determination	Analysis					
Conservation and Open Space Element							
Preservation of Water Resources, Goal 6: The County will conserve, protect, and enhance water resources in the County.	Consistent	Since the project would temporarily convert farmland into a non-agricultural use, the project would reduce the need for IID to fallow irrigation; thereby, reducing agricultural water demand.					
Preservation of Water Resources, Objective 6.4: Eliminate potential surface and groundwater pollution through regulations as well as educational programs.	Consistent	Currently, groundwater quality in the region is poor. However, since the project would temporarily convert farmland into a non-agricultural use, the project would reduce the amount of water used on site; thereby, reducing potential surface and groundwater pollution from agricultural uses. Additionally, the project would be required to comply with NPDES permits and regulations to address pollutants from run-off that may result during construction and operation of the project.					
Rei	newable Energy a	nd Transmission Element					
Objective 1.6: Encourage the efficient use of water resources required in the operation of renewable energy generation facilities.	Consistent	Water for the project site will be used on site during construction, operation, and decommissioning/restoration for non-drinking non-potable water needs. Additionally, as further detailed in Section 3.15.3, the project would result in a decrease in water use compared to the current active agricultural uses on the project site.					

Source: ICPDS 1993
IID = Imperial Irrigation District

3.15.3 Impacts and Mitigation Measures

Thresholds of Significance

Based on CEQA Guidelines Appendix G, project impacts related to utilities and service systems are considered significant if any of the following occur:

Water Supply

 Have insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years

Methodology

The WSA (Appendix H of this EIR) was prepared using project-specific data to calculate the project's water consumption during construction and at build-out collectively ("operational").

Impact Analysis

Impact 3.15-1 Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?

CONSTRUCTION

The proposed project is anticipated to take approximately 6-9 months from the commencement of the construction process to complete. Construction water needs would be limited to earthwork, soil conditioning, dust suppression, and compaction efforts. As shown in Table 3.15-3, the proposed project would require approximately 32.5 AFY of water during construction. This includes the 20,000 gallons of water that will need to be stored on the project site during construction per Imperial County Fire Standards.

OPERATIONS AND MAINTENANCE

As shown in Table 3.15-3, estimated annual water consumption for operation and maintenance of the proposed project, including periodic PV module washing, would be approximately 86.8 acre feet or 3.1 AFY, which would be trucked to the project site as needed. This includes the 180,000 gallons of water that will need to be stored on the project site during operations per Imperial County Fire Standards. No full-time site personnel would be required on-site during operations and approximately two employees would only be onsite up to four times per year to wash the solar panels to ensure optimum solar absorption by removing dust particles and other buildup.

DECOMMISSIONING

If at the end of the Power Purchase Agreement (PPA) term, no contract extension is available for a power purchaser, no other buyer of the energy emerges, or there is no further funding of the project, the project will be decommissioned and dismantled. As shown in Table 3.15-3, total water demand during decommissioning is estimated to be 32.5 AFY.

TOTAL AND ANNUAL WATER DEMAND

According to the WSA (Appendix H of this EIR), the anticipated water demand for construction, operation, and decommissioning of the project is estimated to be 151.8 AF, for an annualized demand of 5.06 AFY for the 30-year project life (Table 3.15-3).

Table 3.15-3. Project Water Use

Water Use	Expected Years	Total
Construction Water ¹	1	32.5 AF
Total for Water Construction		32.5 AF
Processing, Daily Plant Operations & Mitigation ²	28	3.1 AFY

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Table 3.15-3. Project Water Use

Water Use	Expected Years	Total
Total Water Usage for Processing Daily Plant Operations & Mitigation		86.8 AF
Project Decommissioning	1	32.5 AF
Total for Project Decommissioning		32.5 AF
Total Water Usage for Project	30	151.8 AF
Amortized	30	5.06 AFY

Source: Appendix H of this EIR

AF = acre-feet; AFY = acre-feet per year

WATER SUPPLY

Water for the project site will be supplied by the adjacent Best Canal Lateral X through an IWSP Water Supply Agreement with IID to process the untreated Colorado River water for the proposed project. The IWSP sets aside 25,000 acre-feet annually (AFY) of IID's Colorado River water supply to serve new non-agricultural projects. As of October 2021, a balance of 23,800 AFY remain available under the IWSP for new non-agricultural projects ensuring reasonably sufficient supplies for such projects. As shown in Table 3.15-4, the proposed project's water demand during construction for a period of 1 year using approximately 32.5 AFY, represents approximately 0.03% of the annual unallocated supply set aside for new non-agricultural projects. The proposed project's total water demand for operations is approximately 3.1 AFY for 28 years and represents approximately 0.01% of the annual unallocated supply set aside for new non-agricultural projects. Decommissioning is expected to take 1 year and use approximately 32.5 AFY, representing approximately 0.03% of the annual unallocated supply set aside for new non-agricultural projects. As shown in Table 3.15-4, the project is expected to consume 151.8 AF for the 30-year lifespan of the project which would equate to 5.06 AFY amortized representing 0.02% of the annual unallocated supply set aside for new non-agricultural projects. Thus, the proposed project's estimated water demand would not affect IID's ability to provide water to other users in IID's water service area. Therefore, the proposed project would have sufficient water supplies available to serve the project from existing entitlements and resources, and impacts would be less than significant.

Table 3.15-4. Amortized Project Water Summary

Project Phase	Project Water Use	Years	Total Combined (AF)	IWSP (AFY)	% of Remaining Unallocated IWSP per Year
Construction	32.5 AFY	1	32.5 AF	23,800 AFY	0.03%
Operations	3.1 AFY	28	86.8 AF	23,800 AFY	0.01%
Decommissioning	32.5 AFY	1	32.5 AF	23,800 AFY	0.03%

^{1 – 20,000} gallons of water will need to be stored on site during construction per Imperial County Fire Standards.

^{2 - 180,000} gallons of water will need to be stored on site per Imperial County Fire Standards for operations.

Total	5.06 AFY	30	151.8 AF	23,800 AFY	0.02%

Source: Appendix H of this EIR

Mitigation Measure(s)

No mitigation measures are required.

3.15.4 Decommissioning/Restoration and Residual Impacts

Decommissioning/Restoration

If at the end of the PPA term, no contract extension is available for a power purchaser, no other buyer of the energy emerges, or there is no further funding of the project, the project will be decommissioned and dismantled. As shown in Table 3.15-3, total water demand during decommissioning is estimated to be 32.5 AFY. As described above, the proposed project's estimated water demand, which includes decommissioning, would not affect IID's ability to provide water to other users in IID's water service area. The proposed project would have sufficient water supplies available to serve the project from existing entitlements and resources, and impacts would be less than significant.

Residual

The proposed project would not result in significant impacts on the water supply of Imperial County; therefore, no mitigation is required. The proposed project will not result in residual impacts.

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4 Analysis of Long-Term Effects

4.1 Growth-Inducing Impacts

In accordance with Section 15126.2(e) of CEQA Guidelines, an EIR must:

"discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth ... Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. Also discuss the characteristics of some projects which may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment."

Projects promoting direct growth will impose burdens on a community by directly inducing an increase in population or resulting in the construction of additional developments in the same area. For example, projects involving expansions, modifications, or additions to infrastructure, such as sewer, water, and roads, could have the potential to directly promote growth by removing existing physical barriers or allowing for additional development through capacity increases. New roadways leading into a previously undeveloped area directly promote growth by removing previously existing physical barriers to development and a new wastewater treatment plant would allow for further development within a community by increasing infrastructure capacity. Because these types of infrastructure projects directly serve related projects and result in an overall impact to the local community, associated impacts cannot be considered isolated. Indirect growth typically includes substantial new permanent employment opportunities and can result from these aforementioned modifications.

The proposed project is located within the unincorporated area of Imperial County and it does not involve the development of permanent residences that would directly result in population growth in the area. The unemployment rate in Imperial County, as of August 2021 was 19.4 percent (State of California Employment Development Department 2021b), which represents an approximately 1.3 percent decrease in unemployment from September 2019 (20.7 percent) (State of California Employment Development Department 2021b). The applicant expects to utilize construction workers from the local and regional area, a workforce similar to that involved in the development of other utility-scale solar facilities. Based on the unemployment rate, and the availability of the local workforce, construction of the proposed project would not have a growth-inducing effect related to workers moving into the area and increasing the demand for housing and services.

Once construction is completed, the facility would be remotely operated, controlled and monitored and with no requirement for daily on-site employees. Security personnel may conduct unscheduled security rounds and would be dispatched to the project site in response to a fence breach or other alarm. It is anticipated that maintenance of the facilities would require minimal site presence to perform periodic visual inspections and minor repairs. On intermittent occasions, the presence of additional workers may be required for repairs or replacement of equipment and panel cleaning; however, because of the nature of the facilities, such actions would likely occur infrequently. Overall, minimal maintenance requirements are anticipated. The proposed project would not result in substantial population growth, as the number of employees required to operate and maintain the facility is minimal.

While the proposed project would contribute to energy supply, which indirectly supports population growth, the proposed project is a response to the state's need for renewable energy to meet its Renewable Portfolio Standard, and while it would increase the availability of renewable energy, it would also replace existing sources of non-renewable energy. Unlike a gas-fired power plant, the proposed project is not being developed as a source of base-load power in response to growth in demand for electricity. The power generated would be added to the state's electricity grid with the intent that it would displace fossil fueled power plants and their associated environmental impacts, consistent with the findings and declarations in SB 2 that a benefit of the Renewable Portfolio Standard is displacing fossil fuel consumption within the state. The project is being proposed in response to state policy and legislation promoting development of renewable energy.

The proposed project would supply energy to accommodate and support existing demand and projected growth, but the energy provided by the project would not foster any new growth because (1) the additional energy would be used to ease the burdens of meeting existing statewide energy demands within and beyond the area of the project site; (2) the energy would be used to support already-projected growth; or, (3) the factors affecting growth are so diverse that any potential connection between additional energy production and growth would necessarily be too speculative and uncertain to merit further analysis.

Under CEQA, an EIR should consider potentially significant energy implications of a project (CEQA Guidelines Appendix F(II); PRC Section 21100(b)(3)). However, the relationship between the proposed project's increased electrical capacity and the growth-inducing impacts outside the surrounding area is too speculative and uncertain to warrant further analysis. When a project's growth-inducing impacts are speculative, the lead agency should consider 14 CCR Section 15145, which provides that, if an impact is too speculative for evaluation, the agency should note this conclusion and terminate discussion of the impact. As the court explained in Napa Citizens for Honest Gov't v. Napa County Board of Supervisors, 91 Cal. App.4th 342, 368: "Nothing in the Guidelines, or in the cases, requires more than a general analysis of projected growth" Napa Citizens, 91 CA4th at 369. The problem of uncertainty of the proposed project's growth-inducing effects cannot be resolved by collection of further data because of the diversity of factors affecting growth.

While this document has considered that the proposed project, as an energy project, might foster regional growth, the particular growth that could be attributed to the proposed project is unpredictable, given the multitude of variables at play, including uncertainty about the nature, extent, and location of growth and the effect of other contributors to growth besides the proposed project. No accurate and reliable data is available that could be used to predict the amount of growth outside the area that would result from the proposed project's contribution of additional electrical capacity. The County of Imperial has not adopted a threshold of significance for determining when an energy project is growth-inducing. Further evaluation of this impact is not required under CEQA.

Additionally, the project would not involve the development of any new local or regional roadways, new water systems, or sewer; and thus, the project would not further facilitate additional development into outlying areas. For these reasons, the proposed project would not be growth-inducing.

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4.2 Significant Irreversible Environmental Changes

In accordance with CEQA Guidelines Section 15126.2(d), an EIR must identify any significant irreversible environmental changes that would be caused by implementation of the proposed project being analyzed. Irreversible environmental changes may include current or future commitments to the use of non-renewable resources or secondary growth-inducing impacts that commit future generations to similar uses.

Energy resources needed for the construction of the proposed project would contribute to the incremental depletion of renewable and non-renewable resources. Resources, such as timber, used in building construction are generally considered renewable and would ultimately be replenished. Non-renewable resources, such as petrochemical construction materials, steel, copper, lead and other metals, gravel, concrete, and other materials, are typically considered finite and would not be replenished over the lifetime of the project. Thus, the project would irretrievably commit resources over the anticipated 30-year life of the project.

At the end of the project's operation term, the applicant may determine that the project should be decommissioned and deconstructed. Should the project be decommissioned, the project applicant is required to restore land to its pre-project state. Consequently, some of the resources on the site could potentially be retrieved after the site has been decommissioned. Concrete footings, foundations, and pads would be removed and recycled at an off-site location. All remaining components would be removed, and all disturbed areas would be reclaimed and recontoured. The applicant anticipates using the best available recycling measures at the time of decommissioning.

Implementation and operation of the proposed project would promote the use of renewable energy and contribute incrementally to the reduction in demand for fossil fuel use for electricity-generating purposes. Therefore, the incremental reduction in fossil fuels would be a positive effect of the commitment of nonrenewable resources. Additionally, the project is consistent with the state's definition of an "eligible renewable energy resource" in Section 399.12 of the California Public Utilities Code and the definition of "in-state renewable electricity generation facility" in Section 25741 of the California PRC.

4.3 Significant and Unmitigable Impacts

In accordance with CEQA Guidelines Section 15126(c), EIRs must include a discussion of significant environmental effects that cannot be avoided if the proposed project is implemented. The impact analysis, as detailed in Section 3 of this EIR, concludes that no significant and unmitigable impacts were identified. Where significant impacts have been identified, mitigation measures are proposed, that when implemented, would reduce the impact level to less than significant.

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5 Cumulative Impacts

The CEQA Guidelines (Section 15355) define a cumulative impact as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." The CEQA Guidelines [Section 15130(a)(1)] further states that "an EIR should not discuss impacts which do not result in part from the project."

Section 15130(a) of the CEQA Guidelines provides that "[A]n EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable..." Cumulatively considerable, as defined in Section 15065(a)(3), "means that 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 probable future projects."

An adequate discussion of significant cumulative impacts requires either: (1) "a list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency; or (2) "a summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area-wide conditions contributing to the cumulative impact."

The CEQA Guidelines recognize that cumulative impacts may require mitigation, such as new rules and regulations that go beyond project-by-project measures. An EIR may also determine that a project's contribution to a significant cumulative impact will be rendered less than cumulatively considerable and thus is not significant. A project's contribution is less than cumulatively considerable if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact. The Lead Agency must identify facts and analysis supporting its conclusion that the contribution will be rendered less than cumulatively considerable (CEQA Guidelines Section 15130(a)(3)).

This EIR evaluates the cumulative impacts of the project for each resource area, using the following steps:

- Define the geographic and temporal scope of cumulative impact analysis for each cumulative effects issue, based on the project's reasonably foreseeable direct and indirect effects.
- 2. Evaluate the cumulative effects of the project in combination with past and present (existing) and reasonably foreseeable future projects and, in the larger context of the Imperial Valley.
- 3. Evaluate the project's incremental contribution to the cumulative effects on each resource considered in Chapter 3, Environmental Analysis. When the project's incremental contribution to a significant cumulative impact is considerable, mitigation measures to reduce the project's "fair share" contribution to the cumulative effect are discussed, where required.

5.1 Geographic Scope and Timeframe of the Cumulative Effects Analysis

The geographic area of cumulative effects varies by each resource area considered in Chapter 3. For example, air quality impacts tend to disperse over a large area, while traffic impacts are typically more localized. Similarly, impacts on the habitats of special-status wildlife species need to be considered within its range of movement and associated habitat needs.

The analysis of cumulative effects in this EIR considers a number of variables including geographic (spatial) limits, time (temporal) limits, and the characteristics of the resource being evaluated. The geographic scope of each analysis is based on the topography surrounding the project site and the natural boundaries of the resource affected, rather than jurisdictional boundaries. The geographic scope of cumulative effects will often extend beyond the scope of the direct effects of a project, but not beyond the scope of the direct and indirect effects of that project.

The cumulative development scenario includes projects that extend through year (2030), which is the planning horizon of the County of Imperial General Plan. Because of uncertain development patterns that are far in the future, it is too speculative to accurately determine the type and quantity of cumulative projects beyond the planning horizon of the County's adopted County General Plan. Evaluating the proposed project's cumulative impacts when future facility decommissioning occurs is highly speculative because decommissioning is expected to occur in 20 to 25 years' time. Therefore, cumulative impacts during decommissioning are speculative for detailed consideration in this analysis.

5.2 Projects Contributing to Potential Cumulative Impacts

The CEQA Guidelines identify two basic methods for establishing the cumulative environment in which the projects are to be considered: the use of a list of past, present, and probable future projects (the "list approach") or the use of adopted projections from a general plan, other regional planning document, or certified EIR for such a planning document (the "plan approach").

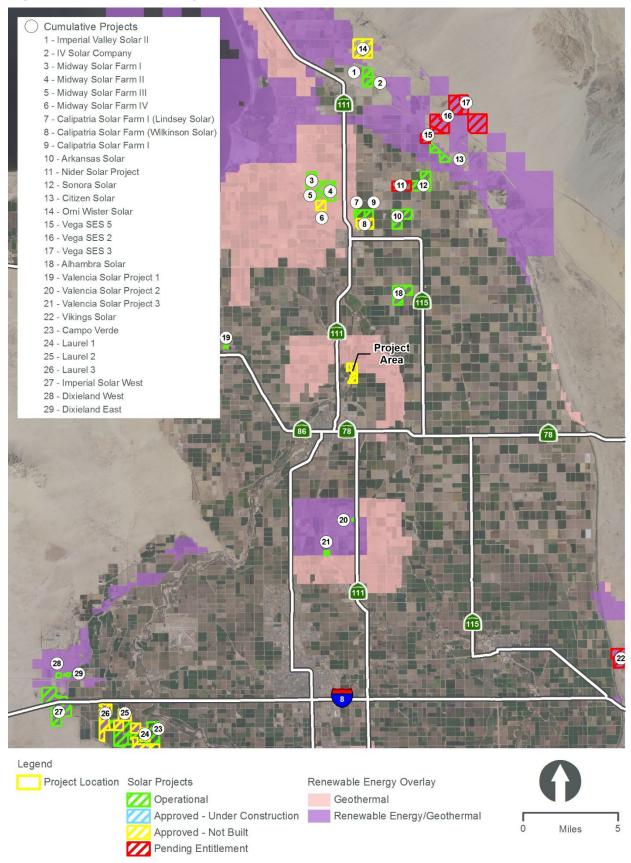
For this EIR, the list approach has been utilized to generate the most reliable future projections of possible cumulative impacts. When the impacts of the project are considered in combination with other past, present, and future projects to identify cumulative impacts, the other projects considered may also vary depending on the type of environmental impacts being assessed. As described above, the general geographic area associated with different environmental impacts of the project defines the boundaries of the area used for compiling the list of projects considered in the cumulative impact analysis. Figure 5-1 provides the general location for each of these projects in relation to the project site.

5.3 Cumulative Impact Analysis

This cumulative impact analysis utilizes an expanded list method (as defined under CEQA) and considers environmental effects associated with those projects identified in Table 5-1 in conjunction with the impacts identified for the project in Chapter 3 of this EIR. Table 5-1 includes solar projects known at the time of release of the NOP of the Draft EIR, as well as additional projects that have been proposed since the NOP date. Figure 5-1 provides the general location for each of these projects in relation to the project site.

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Figure 5-1. Cumulative Projects



5 Cumulative Impacts Final EIR | Brawley Solar Energy Facility Project

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Table 5-1. Projects Considered in the Cumulative Impact Analysis

Map Label ¹	Project Name	Project Type	Distance from Brawley Project Site	Size (acres)	Capacity (MW)	Status ²
1	Imperial Valley Solar II	PV Solar Facility	Approximately 16.30 miles north	146	20	Operational
2	IV Solar Company	PV Solar Facility	Approximately 15.80 miles north	123	23	Operational
3	Midway Solar Farm I	PV Solar Facility	Approximately 10.30 miles northwest	480	50	Operational
4	Midway Solar Farm II	PV Solar Facility	Approximately 10.30 miles northwest	803	155	Operational
5	Midway Solar Farm III	PV Solar Facility	Approximately 10.20 miles northwest	160	20	Operational
6	Midway Solar Farm IV	PV Solar Facility	Approximately 9.29 miles northwest	160	15	Approved – Not Built
7	Calipatria Solar Farm I (Lindsey Solar)	PV Solar Facility	Approximately 8.60 miles north	148	20	Operational
8	Calipatria Solar Farm (Wilkinson Solar)	PV Solar Facility	Approximately 8.60 miles north	302	30	Approved – Not Built
9	Calipatria Solar Farm I	PV Solar Facility	Approximately 8.10 miles north	159	20	Operational
10	Arkansas Solar	PV Solar Facility	Approximately 8.50 miles northeast	481	50	Operational
11	Nider Solar Project	PV Solar Facility	Approximately 10.50 miles northeast	320	100	Pending Entitlement
12	Sonora Solar	PV Solar Facility	Approximately10.90 miles northeast	488	50	Operational
13	Citizens Solar	PV Solar Facility	Approximately 13.00 miles northeast	159	30	Operational
14	Ormat Wister Solar	PV Solar Facility	Approximately 17.30 miles north	160	20	Approved – Not Built
15	VEGA SES 5	PV Solar Facility	Approximately 13.30 miles northeast			Pending Entitlement

Table 5-1. Projects Considered in the Cumulative Impact Analysis

Map Label ¹	Project Name	Project Type	Distance from Brawley Project Site	Size (acres)	Capacity (MW)	Status ²
16	VEGA SES 2	PV Solar Facility	Approximately 15.20 miles northeast	1,963 (combined total for	350 (combined total for	Pending Entitlement
17	VEGA SES 3	PV Solar Facility	Approximately 14.90 miles northeast	VEGA 2, 3, and 5)	VEGA 2, 3, and 5)	Pending Entitlement
18	Alhambra Solar	PV Solar Facility	Approximately 5.00 miles northeast	482	50	Operational
19	Valencia Solar Project 1	PV Solar Facility	Approximately 7.00 miles west	17	3	Operational
20	Valencia Solar Project 2	PV Solar Facility	Approximately 7.30 miles south	17	3	Operational
21	Valencia Solar Project 3	PV Solar Facility	Approximately 9.20 miles southwest	19	3	Operational
22	Vikings Solar	PV Solar Facility	Approximately 20.00 miles southeast	604	150	Pending Entitlement
23	Campo Verde	PV Solar Facility	Approximately 20.10 miles southwest	1,400	139	Operational
24	Laurel 1	PV Solar Facility	Approximately 21.60 miles southwest	1,396 (combined total for	325 (combined total for	Approved – Not Built
25	Laurel 2	PV Solar Facility	Approximately 22 miles southwest	Laurel 1, 2, and 3)	1, Laurel 1, 2,	Approved – Not Built
26	Laurel 3	PV Solar Facility	Approximately 22 miles southwest			Approved – Not Built
27	Imperial Solar West	PV Solar Facility	Approximately 22 miles southwest	1,145	150	Operational
28	Dixieland West	PV Solar Facility	Approximately 22 miles southwest	32	3	Operational
29	Dixieland East	PV Solar Facility	Approximately 22 miles southwest	31	2	Operational

^{1 –} See Figure 5-1 for cumulative project location.

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^{2 –} Project status based on information provided by County staff and on Imperial County Planning & Development Service's RE Geographic Information System Mapping Application (http://icpds.maps.arcgis.com/apps/Viewer/index.html?appid=c6fd31272e3d42e1b736ce8542b994ae). Accessed on October 5, 2021.

IID – Imperial Irrigation District; MW – megawatts; PV – photovoltaic

5.3.1 Aesthetics

The cumulative study area for projects considered in the visual resources cumulative impact analysis considers a 5-mile radius from the project site. Views beyond 5 miles are obstructed by a combination of the flat topography coupled with the Earth's curvature. The short-term visual impacts of the project would be in the form of general construction activities including grading, use of construction machinery, and installation of the transmission poles and stringing of transmission lines, but would only be available to a very limited amount of people and would have to be in relatively close proximity to the project site. Longer-term visual impacts of the project would be in the form of the presence of solar array grids, an electrical distribution and transmission system, and substation.

As provided in Section 3.2, Aesthetics, the existing visual character of the project site and the quality of views in terms of visibility beyond the site would not be substantially altered. The visual changes associated with the project would not be located in proximity to any designated scenic vistas or scenic highways. The proposed project would be absorbed into the broader landscape that already includes agricultural development, electricity transmission, geothermal power plants, and the City of Brawley Wastewater Treatment Plant. Further, the project site would be restored to its existing condition following the decommissioning of the solar uses. As a result, although the visual character of the project site would change from undeveloped to one with developed characteristics, a less than significant impact associated with the proposed project has been identified.

Development of the proposed project in conjunction with the cumulative projects identified in Table 5-1 will gradually change the visual character of this portion of the Imperial Valley. However, projects located within private lands and/or under the jurisdiction of the County of Imperial are being designed in accordance with the County of Imperial's General Plan and Land Use Ordinance, which includes policies to protect visual resources in the County.

Finally, all projects listed in Table 5-1 would not produce a substantial amount of light and glare, as no significant source of light or glare is proposed, or the project will otherwise comply with the County lighting ordinance, as would all other related projects. Based on these considerations, there would be no significant cumulatively considerable aesthetic impact, and cumulative aesthetic impacts would be less than significant.

5.3.2 Agricultural Resources

Cumulative impacts on agricultural resources take into account the proposed project's temporary impacts as well as those likely to occur as a result of other existing, proposed, and reasonably foreseeable projects. To determine cumulative impacts on agricultural resources, an assessment is made of the temporal nature of the impacts on individual resources (e.g., temporary such as in solar projects versus permanent as in industrial or residential developments) as well as the inventory of agricultural resources within the cumulative setting.

As discussed in Section 3.3, Agricultural Resources, the majority of the project site is designated as Farmland of Statewide Importance, with a pocket of Prime Farmland and Farmland of Local Importance1 located in the southern portion of the project site. Approximately 1 acre of Unique Farmland occurs along the western boundary of the project site. Therefore, the proposed project would

¹ It should be noted that analysis of Other Land and Farmland of Local Importance is not required under CEQA significance criteria, as these designations are not considered an "agricultural land" per CEQA Statute Section 21060.1(a).

convert land designated as Prime Farmland, Farmland of Statewide Importance, and Unique Farmland to non-agricultural uses, and, as such, incrementally add to the conversion of agricultural land in Imperial County. According to the California Farmland Conversion Report, approximately half of the County (522,375 acres out of a total of 1,028,508 acres) is Important Farmland (DOC 2018). Table 5-2 summarizes the percentage of each type of farmland in the County that would be converted by the proposed project. As shown in Table 5-2, the project would temporarily convert a very small fraction of the total Important Farmlands in the County and have a minimal effect on agricultural land on a cumulative scale. Furthermore, the conversion would be temporary, lasting only for the duration of the project's useful life, which is expected to be 20-25 years.

<u>Table 5-2. Important Farmland Conversion</u>

Land Use Category	Total Acreage in Imperial County	<u>Project-Related</u> <u>Conversion (acres)</u>	Project Percent of County Acreages (%)
Prime Farmland	<u>189,163</u>	<u>4.4</u>	<u><0.01%</u>
Farmland of Statewide Importance	<u>291,596</u>	<u>205</u>	<u>0.07%</u>
Unique Farmland	<u>1,905</u>	<u>1.0</u>	<u>0.05%</u>
Farmland of Local Importance	<u>39,711</u>	<u>12</u>	0.03%
<u>Total</u>	<u>522,375</u>	222.4	0.04%

Source: DOC 2018

However Furthermore, the project site is located on land designated for agricultural uses. The project would be constructed on land currently zoned A-2-G (General Agricultural with a Geothermal Overlay). Pursuant to Title 9, Division 5, Chapter 8, the following uses are permitted in the A-2 zone subject to approval of a CUP from Imperial County: solar energy electrical generator, battery storage facility, electrical substations, communication towers, and facilities for the transmission of electrical energy. Upon approval of a CUP and Zone Change into the RE Overlay Zone designation, the project's uses would be consistent with the Imperial County Land Use Ordinance and thus is also consistent with the General Plan land use designation of the site. Additionally, as a condition of project approval, the project applicant or its successor in interest will be responsible for implementing a reclamation plan when the project is decommissioned at the end of its lifespan.

As discussed in Section 3.3, Agricultural Resources, Mitigation Measure AG-1a (Payment of Agricultural and Other Benefit Fees), AG-1b (Site Reclamation Plan), and AG-2 (Pest Management Plan) would be implemented to reduce potential impacts on agricultural resources to a level less than significant. Each individual cumulative project would be or would have been required to provide mitigation for any impacts on agricultural resources in accordance with the County's policies directed at mitigating the impact associated with the conversion of important farmlands. Therefore, the project's contribution to this impact would be less than cumulatively considerable.

5.3.3 Air Quality

Imperial County is used as the geographic scope for analysis of cumulative air quality impacts. As shown in Table 5-1, many of the cumulative projects are large-scale renewable energy generation

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projects, where the main source of air emissions would be generated during the construction phases of these projects; however, there would also be limited operational emissions associated with operations and maintenance activities for these facilities. Additionally, a majority of the projects listed in Table 5-1 are already constructed and operational. Therefore the potential for a cumulative, short-term air quality impact as a result of construction activities is anticipated to be less than significant.

Currently, the SSAB is either in attainment or unclassified for all federal and state air pollutant standards with the exception of 8-Hour O₃, PM₁₀, and PM_{2.5}. Imperial County is classified as a "serious" nonattainment area for PM₁₀ for the NAAQS.

The AQAP for the SSAB, through the implementation of the AQMP and SIP for PM₁₀, sets forth a comprehensive program that will lead the SSAB into compliance with all federal and state air quality standards. With respect to PM₁₀, the ICAPCD implements Regulation VIII – Fugitive Dust Rules, to control these emissions and ultimately lead the basin into compliance with air standards, consistent with the AQAP. Within Regulation VIII are Rules 800 through 806, which address construction and earthmoving activities, bulk materials, carry-out and track-out, open areas, paved and unpaved roads, and conservation management practices. Best Available Control Measures to reduce fugitive dust during construction and earthmoving activities include but are not limited to:

- Phasing of work in order to minimize disturbed surface area;
- Application of water or chemical stabilizers to disturbed soils;
- Construction and maintenance of wind barriers; and
- Use of a track-out control device or wash down system at access points to paved roads.

Compliance with Regulation VIII is mandatory on all construction sites, regardless of size. However, compliance with Regulation VIII does not constitute mitigation under the reductions attributed to environmental impacts. In addition, compliance for a project includes: (1) the development of a dust control plan for the construction and operational phase; and (2) notification to the air district is required 10 days prior to the commencement of any construction activity.

Construction

The proposed project would generate air emissions due to vehicle and dust emissions associated with construction activities. Similar effects would also be realized upon site decommissioning, which would be carried out in conjunction with the project's restoration plan, and subject to applicable ICAPCD standards. Likewise, the other cumulative projects that are approved, but not yet built (Midway Solar Farm I, Orni Wister Solar, Calipatria Solar Farm [Wilkinson Solar], Laurel I, Laurel II, and Laurel III), or pending entitlement (Nider Solar Project, Vega SES 2, 3, and 5, and Viking Solar) identified in Table 5-1 would result in the generation of air emissions during construction activities.

With respect to the proposed project, during the construction and decommissioning phases, the project would generate PM₁₀, PM_{2.5}, ROG, CO, and NO_x emissions during each active day of construction. However, as discussed in Section 3.4, Air Quality, the project would not result in a significant increase in CO, ROG, and NO_x that would exceed ICAPCD thresholds.

However, the project's impact could be cumulatively considerable because: (1) portions of the SSAB are nonattainment already (PM₁₀ and PM_{2.5}), although mitigated by ICAPCD Regulations; and, (2) project construction would occur on most days, including days when O₃ already in excess of state

standards. Additionally, the effects could again be experienced in the future during decommissioning in conjunction with site restoration.

The proposed project, in conjunction with the construction of other cumulative projects as identified in Table 5-1 (Midway Solar Farm I, Orni Wister Solar, Calipatria Solar Farm [Wilkinson Solar], Laurel I, Laurel II, Laurel III, Nider Solar Project, Vega SES 2, 3, and 5, and Viking Solar), could result in a cumulatively considerable increase in the generation of PM₁₀ and NO_x; however, like the proposed project, cumulative projects would be subject to mitigation pursuant to County ICAPCD's Regulations and Rules, and the cumulative impact would be reduced to a level less than significant through compliance with these measures. Because the project will be required to implement measures consistent with ICAPCD regulations designed to alleviate the cumulative impact associated with PM₁₀, the proposed project's contribution is rendered less than cumulatively considerable and is therefore, less than significant.

Operation

As the proposed project would have no major stationary emission sources and would require minimal vehicular trips, operation of the proposed solar facility would result in substantially lower emissions than project construction. The project's operational emissions would not exceed the Tier I thresholds; therefore, the impact would be less than significant. Operational impacts of other renewable energy facilities identified in Table 5-1 would also be similar. Although these cumulative projects generally involve large areas, their operational requirements are very minimal, requiring minimal staff or use of machinery or equipment that generate emissions. Further, alternative energy projects, such as the project, would assist attainment of regional air quality standards and improvement of regional air quality by providing clean, renewable energy sources. Consequently, the projects would provide a positive contribution to the implementation of applicable air quality plan policies and compliance with EO S-3-05.

However, from a cumulative air quality standpoint, the potential cumulative impact associated with the generation of PM₁₀ and PM_{2.5} emissions during operation of the cumulative projects is a consideration because of the fact that Imperial County is classified as a "serious" non-attainment area for PM₁₀ and a "moderate" non-attainment area for 8-hour O₃ and PM_{2.5} for the NAAQS. However, as with the construction phases, the cumulative projects would be required to comply with ICAPCD's Regulation VIII for dust control (Regulation VIII applies to both the construction and operational phases of projects). As a result, the ICAPCD would require compliance with the various dust control measures and, in addition be required to prepare and implement operational dust control plans as approved by the ICAPCD, which is a component of ICAPCD's overall framework of the AQAP for the SSAB, which sets forth a comprehensive program that will lead the SSAB into compliance with all federal and state air quality standards. Therefore, the project would not contribute to long-term cumulatively considerable air quality impacts and the project would not result in cumulatively significant air quality impacts, and cumulative impacts would be less than significant.

5.3.4 Biological Resources

The geographic scope for considering cumulative impacts on biological resources includes the Imperial Valley and related biological habitats. Table 5-1 lists the projects considered for the biological resources cumulative impact analysis.

In general terms, in instances where a potential impact could occur, CDFW and USFWS have promulgated a regulatory scheme that limits impacts on these species. The effects of the project would

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be rendered less than significant through mitigation requiring compliance with all applicable regulations that protect plant, fish, and animal species, as well as waters of the U.S. and state. Other cumulative projects would also be required to avoid impacts on special-status species and/or mitigate to the satisfaction of the CDFW and USFWS for the potential loss of habitat. As described in Section 3.5, Biological Resources, one plant species, Abram's spurge, has a low potential to occur due to the limited suitable habitat within the project site. Three wildlife species have a low potential to occur (flat-tailed horned lizard, short-eared owl, and western yellow bat) on the project site, two wildlife species have a high potential to occur (BUOW and mountain plover) on the project site, and one wildlife species (loggerhead shrikes) was observed onsite during site reconnaissance. As such, the project has the potential to result in direct impacts on biological resources. Additionally, project construction has the potential to result in direct and indirect impacts on nesting birds.

Mitigation measures identified in Section 3.5, Biological Resources, would ensure that all regulations required to protect these species are implemented, thereby minimizing potential impacts on these species to a less than significant level. Similarly, the cumulative projects within the geographic scope of the project would be required to comply with the legal framework as described above. Based on these considerations, impacts on biological resources would not be cumulatively considerable.

As with the proposed project, each of the cumulative projects would be required to provide mitigation for impacts on biological resources. The analysis below is conducted qualitatively and in the context that the cumulative projects would be subject to a variety of statutes and administrative frameworks that require mitigation for impacts on biological resources.

Birds listed at 50 CFR 10.3 are protected by the MBTA (16 USC 703 et seq.), a Federal statute that implements treaties with several countries on the conservation and protection of Birds listed at 50 CFR 10.3 are protected by the MBTA (16 USC 703 et seq.), a Federal statute that implements treaties with several countries on the conservation and protection of migratory birds. The MBTA is enforced by USFWS. This act prohibits the killing of any migratory birds without a valid permit. Any activity which contributes to unnatural migratory bird mortality could be prosecuted under this act. With few exceptions, most birds are considered migratory under this act. Raptors and active raptor nests are protected under California FGCs 3503.5, 3503, and 3513.

The CWA and California's Porter-Cologne Water Quality Control Act provide protection for water-related biological resources by controlling pollution, setting water quality standards, and preventing jurisdictional streams, lakes, and rivers from being filled without a federal permit. Several jurisdictional features were observed within the project site. The New River, a NWI mapped blueline, flows approximately .2 miles to the west of the project site. In addition, several NWI mapped blueline canals, drains, and ditches owned by IID flow along the borders of the project site. However, the project has been located, and consequently designed, to avoid impacts to waters of the State and waters of the U.S.

Given the above, the project would not contribute substantially to a cumulative biological resources impact. Similarly, the cumulative projects within the geographic scope of the proposed project will be required to comply with the legal frameworks set forth above, as well as others, and will be required to mitigate their impacts to a less than significant level. Therefore, the project would not contribute to a cumulatively considerable impact to biological resources, and cumulative impacts would be less than significant.

5.3.5 Cultural Resources

As discussed in Section 3.6, Cultural Resources, 6 newly recorded cultural resources were identified within the project site during field surveys. Newly identified cultural resources comprise both historic-period and two multi-component sites. Resource 21267-001 is recommended not eligible for listing and the other five resources have not been formally evaluated for potential eligibility for listing in the CRHR. The project applicant will avoid ground-disturbing activities within and in close proximity to these resources. However, if-ground disturbing activities must occur within and in close proximity to these resources, a significant impact may potentially occur. Implementation of Mitigation Measures CUL-1 through CUL-6 would reduce potential impacts associated to cultural historic resources to a level less than significant. Therefore, the proposed project would not cause a substantial adverse change in the significant of a historical resource as defined in Section 15064.5 of the CEQA Guidelines and no impact would occur.

The potential of finding a buried archaeological site during construction is considered low. However, like all construction projects in the state, the possibility exists. This potential impact is considered significant. Implementation of Mitigation Measures CUL-1 through CUL-6 would reduce potential impacts associated with the unanticipated discovery of unknown buried archaeological resources. Implementation of Mitigation Measure CUL-7 would reduce potential impacts on human remains to a level less than significant.

Future projects with potentially significant impacts on cultural resources would be required to comply with federal, state, and local regulations and ordinances protecting cultural resources through implementation of similar project-specific mitigation measures during construction. Therefore, through compliance with regulatory requirements, standard conditions of approval, and Mitigation Measures CUL-1 through CUL-7 the proposed project would have a less than cumulatively considerable contribution to impacts on cultural resources.

During operations and decommissioning of the project, no additional impacts on archaeological resources would be anticipated because the soil disturbance would have already occurred and been mitigated during construction.

5.3.6 Geology and Soils

The Imperial Valley portion of the Salton Trough physiographic province of Southern California is used as the geographic scope for the analysis of cumulative impacts on geology/soils and mineral resources. Cumulative development would result in an increase in population and development that could be exposed to hazardous geological conditions, depending on the location of proposed developments. Geologic and soil conditions are typically site specific and can be addressed through appropriate engineering practices. Cumulative impacts on geologic resources would be considered significant if the project would be impacted by geologic hazard(s) and if the impact could combine with off-site geologic hazards to be cumulatively considerable. None of the projects identified within the geographic scope of potential cumulative impacts would intersect or be additive to the project's site-specific geology and soils impacts; therefore, no cumulatively considerable effects are identified for geology/soils, and cumulative impacts would be less than significant.

Development of the proposed project, in combination with other projects in the area, has the potential to contribute to a cumulatively significant paleontological resources impact due to the potential loss of paleontological resources unique to the region. However, mitigation is included in this EIR to reduce potentially significant project impacts to paleontological resources during construction of the proposed

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project. Implementation of Mitigation Measures GEO-2 through GEO-7 would ensure that the potential impacts on paleontological resources do not rise to the level of significance. Future projects with potentially significant impacts on paleontological resources would be required to comply with federal, state, and local regulations and ordinances protecting paleontological resources through implementation of similar project-specific mitigation measures during construction. Therefore, through compliance with regulatory requirements, standard conditions of approval, and Mitigation Measures GEO-2 through GEO-7, the proposed project would have a less than cumulatively considerable contribution to impacts on paleontological resources.

5.3.7 Greenhouse Gas Emissions

Emissions of GHGs have the potential to adversely affect the environment because such emissions contribute, on a cumulative basis, to global climate change. Although the emissions of the projects alone would not cause global climate change, GHG emissions from multiple projects throughout the world could result in a cumulative impact with respect to global climate change. In turn, global climate change has the potential to result in rising sea levels, which can inundate low-lying areas; affect rainfall and snowfall, leading to changes in water supply; and affect habitat, leading to adverse effects on biological resources.

CAPCOA considers projects that generate more than 900 metric tons of CO2e per year to be significant. This 900 metric tons per year threshold was developed to ensure at least 90 percent of new GHG emissions would be reviewed and assessed for mitigation, thereby contributing to the statewide GHG emissions reduction goals that had been established for the year 2030 under SB 32. Thus, both cumulatively and individually, projects that generate less than 900 metric tons CO₂e per year have a negligible contribution to overall emissions. As discussed in Section 3.8, Greenhouse Gas Emissions, the project would result in the generation of approximately 46 MTCO₂e annualized over the lifetime of the project. Therefore, the construction emissions are less than the CAPCOA's screening threshold of 900 MTCO2e per year. As the project's emissions do not exceed the CAPCOA's threshold, the proposed project would not result in a cumulatively considerable impact to GHG emissions and would not conflict with the State GHG reduction targets. Other cumulative projects identified in Table 5-1 are utility-scale solar facilities. The nature of these projects is such that, like the project, they would be consistent with the strategies of the Climate Change Scoping Plan. In order to meet the AB 32 GHG emissions reduction mandate, the Scoping Plan relies on achievement of the RPS target of 33 percent of California's energy coming from renewable sources by 2020 and 50 percent by 2030. The RPS target was updated in September 2018 under SB 100 to 60 percent by 2030. The project and other similar projects are essential to achieving the RPS.

Given that the project is characterized as a renewable energy project and places emphasis on solar power generation, project operations would be almost carbon-neutral with the majority of the operational GHG emissions associated with vehicle trips. Based on these considerations, no significant long-term operational GHG impacts would occur and, therefore, project-related GHG impacts would not be cumulatively considerable.

5.3.8 Hazards and Hazardous Materials

The geographic scope considered for cumulative impacts from health, safety, and hazardous materials is the area within 1 mile of the boundary of the project sites. One mile is the standard American Society of Testing and Materials (ASTM) standard search distance for hazardous materials.

Under cumulative conditions, implementation of the project in conjunction with the projects listed in Table 5-1 is not anticipated to present a public health and safety hazard to residents. Additionally, the project and related projects would all involve the storage, use, disposal, and transport of hazardous materials to varying degrees during construction, operation, and decommissioning. Impacts from these activities are less than significant for the project because the storage, use, disposal, and transport of hazardous materials are extensively regulated by various Federal, state, and local laws, regulations, and policies. It is foreseeable that the project and related projects would implement and comply with these existing hazardous materials laws, regulations, and policies. Therefore, the related projects would not cause a cumulative impact, and the project would not result in a cumulatively considerable incremental contribution to a cumulative impact related to use or routine transport of hazardous materials.

5.3.9 Hydrology and Water Quality

Table 5-1 lists the projects considered for the hydrology and water quality cumulative impact analysis. The geographic scope for considering cumulative hydrology and water quality impacts is the Imperial Valley Hydrologic Unit as defined by the Colorado Basin RWQCB Basin Plan.

The construction of the project is expected to result in short-term water quality impacts. Compliance with the SWRCB's NPDES general permit for activities associated with construction (2009-0009-DWQ) would reduce water quality impacts. As with the proposed project, each of the cumulative projects would be required to comply with the Construction General Permit. The SWRCB has determined that the Construction General Permit protects water quality, is consistent with the CWA, and addresses the cumulative impacts of numerous construction activities throughout the state. This determination in conjunction with the implementation of mitigation would ensure short-term water quality impacts are not cumulatively considerable.

The project is not expected to result in long-term operations-related impacts related to water quality. The project would mitigate potential water quality impacts by implementing site design, source control, and treatment control BMPs, as outlined in Mitigation Measures HYD-1 and HYD-2. Some cumulative projects would require compliance with the SWRCB's NPDES general permit for industrial activities, as well as rules found in the CWA, Section 402(p)(1) and 40 CFR 122.26, and implemented Order No. 90-42 of the RWQCB. With implementation of SWRCB, Colorado River RWQCB, and County policies, plans, and ordinances governing land use activities that may degrade or contribute to the violation of water quality standards, cumulatively considerable impacts on water quality would be minimized to a less than significant level.

Based on a review of the FEMA Flood Insurance Rate Map FIRM, the proposed project site is located in Zone X (unshaded). The FEMA Zone X (unshaded) designation is an area determined to be outside the 0.2 percent annual chance floodplain. As such, the project would not result in a significant cumulatively considerable impact on floodplains by constructing new facilities within an identified flood hazard zone.

Surface waters in the Imperial Valley ultimately drain into the Salton Sea via the New and Alamo Rivers as well as via irrigation drains and canals. Due to increased demand for water supplies in the region and IID water transfer agreements, increasing amounts of water are being consumed in Imperial Valley. In addition, water is also being transferred out of the Valley to population centers such as San Diego County, thus reducing inflows to the Salton Sea. Project implementation would not substantially alter the existing drainage pattern of the site or area. The majority of the project site would continue to sheet flow through the pervious native soils. The reduction of runoff to the Salton Sea during project

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construction and operation is not expected to combine with similar impacts of large scale proposed, approved and reasonably foreseeable renewable energy projects identified in Table 5-1. Likewise, cumulative impacts associated with runoff reduction would be less than cumulatively considerable.

Based on these considerations, the project would not contribute to or result in a significant cumulatively considerable impact to hydrology or water quality, and cumulative impacts would be less than significant.

5.3.10 Land Use Planning

The geographic scope for the analysis of cumulative land use and planning impacts is typically defined by government jurisdiction. The geographic scope for considering potential inconsistencies with the General Plan's policies from a cumulative perspective includes all lands within the County's jurisdiction and governed by its currently adopted General Plan. In contrast, the geographic scope for considering potential land use impacts or incompatibilities include the project site plus a one-mile buffer to ensure a consideration for reasonably anticipated potential direct and indirect effects.

As provided in Section 3.11, Land Use/Planning, the project would not involve any facilities that could otherwise divide an established community. Based on this circumstance, no cumulatively considerable impacts would occur. As discussed in Section 3.11, Land Use/Planning, the project would not conflict with the goals and objectives of the County of Imperial General Plan if all entitlements (General Plan amendment, Conditional Use Permit, and Zone Change) are approved by the County Board of Supervisors. In addition, a majority of the cumulative projects identified in Table 5-1 would not result in a conflict with applicable land use plans, policies, or regulations. In the event that incompatibilities or land use conflicts are identified for other projects listed in Table 5-1, similar to the projects, the County would require mitigation to avoid or minimize potential land use impacts. Where General Plan Amendments and/or Zone Changes are required to extend the RE Overlay Zone, that project would also be required to demonstrate consistency with the overall goals and policies of the General Plan, and would be required to demonstrate meeting the criteria for extending the RE Overlay onto the project site. Based on these circumstances, no significant cumulatively considerable impact would occur, and cumulative impacts would be less than significant.

5.3.11 Public Services

The project would result in increased demand for public services (fire protection service and law enforcement services) (Section 3.12, Public Services). Future development in the Imperial Valley, including projects identified in Table 5-1, would also increase the demand for public services. In terms of cumulative impacts, the appropriate service providers are responsible for ensuring adequate provision of public services within their jurisdictional boundaries. In conjunction with the project's approval, the project applicant would also be conditioned to ensure sufficient funding is available for any fire protection or prevention needs and law enforcement services. Based on the type of projects proposed (e.g., solar energy generation), their relatively low demand for public services other than fire and police, it is reasonable to conclude that the project would not increase demands for education, or other public services. Service impacts associated with the project related to fire and police would be addressed through payment of impact fees as part of the project's Conditions of Approval to ensure that the service capabilities of these departments are maintained. Therefore, no cumulatively considerable impacts would occur.

5.3.12 Transportation

As stated in Section 3.13, Transportation, during the construction phase of the project, the maximum number of trips generated on a daily basis would be approximately 540 trips. Based on the low amount of construction trips generated and low existing traffic volumes on area roadways, no substantial transportation impacts are anticipated. A majority of the projects listed in Table 5-1 are already constructed. As shown on Table 5-1, there are cumulative projects that are approved, but not yet built (Midway Solar Farm I, Ormat Wister Solar, Calipatria Solar Farm [Wilkinson Solar], Laurel II, and Laurel III), or pending entitlement (Nider Solar Project, Vega SES 2, 3, and 5, and Viking Solar). The construction phasing of these projects is not anticipated to overlap with the proposed project. Furthermore, with exception of SR-111, the cumulative projects are not anticipated to use the same construction haul route as the proposed project. Future operations and maintenance would be conducted remotely, with minimal trips to the project site for panel washing and other solar maintenance. Based on these findings, the project would not result in cumulatively considerable roadway or intersection impacts, and this impact would be less than significant.

5.3.13 Tribal Cultural Resources

As discussed in Section 3.14, Tribal Cultural Resources, no tribes have responded that indicate the potential for traditional cultural properties or sacred sites. Therefore, the proposed project is not anticipated to cause a substantial adverse change in the significance of a tribal cultural resource, and impacts on tribal cultural resources would be less than significant. Future cumulative projects would also be required to comply with the requirements of AB 52 to determine the presence/absence of tribal cultural resources and engage in consultation to determine appropriate mitigation measures to minimize or avoid impacts on tribal cultural resources. Based on these considerations, the project would not contribute to or result in a significant cumulatively considerable impact tribal cultural resources.

5.3.14 Utilities/Service Systems

Future development in Imperial County would increase the demand for utility service in the region. In terms of cumulative impacts, the appropriate service providers are responsible for ensuring adequate provision of public utilities within their jurisdictional boundaries. The proposed project would not require or result in the relocation or construction of new or expanded wastewater facilities, storm water facilities, or water facilities. Additionally, the project would be comprised of mostly recyclable materials and would not generate significant volumes of solid waste that could otherwise contribute to significant decreases in landfill capacity. Based on these considerations, the project would result in less than significant impacts on existing utility providers and, therefore, would not result in cumulatively considerable impacts.

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6 Effects Found Not Significant

In accordance with Section 15128 of the CEQA Guidelines, an EIR must contain a statement briefly indicating the reasons that various potential significant effects of a project were determined not to be significant. Based on the Initial Study and Notice of Preparation prepared for the proposed project (Appendix A of this EIR), Imperial County has determined that the proposed project would not have the potential to cause significant adverse effects associated with the topics identified below. Therefore, these topics are not addressed in this EIR; however, the rationale for eliminating these topics is briefly discussed below.

6.1 Agriculture and Forestry Resources

6.1.1 Forestry Resources

No portion of the project site or the immediate vicinity is zoned or designated as forest lands, timberlands, or timberland production. As such, the proposed project would not result in a conflict with existing zoning or cause the need for a zone change specifically related to 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)). Therefore, implementation of the proposed project would not impact forestry resources.

6.2 Energy

Information for this section is summarized from the *Air Quality, Energy, and Greenhouse Gas Emissions Impact Analysis* prepared for the project by Vista Environmental. This report is included in Appendix C of this EIR.

The proposed project would impact energy resources during construction and operation. Energy resources that would be potentially impacted include electricity, and petroleum-based fuel supplies and distribution systems. The proposed project would not utilize any natural gas during either construction or operation of the proposed project, and no further analysis of natural gas is provided in this analysis.

The following discussion calculates the potential energy consumption associated with the construction and operation of the proposed project and analyzes if any energy utilized by the proposed project is wasteful, inefficient, or unnecessary consumption of energy resources.

6.2.1 Construction Energy

The construction activities for the proposed project are anticipated to include: 1) Site Preparation; 2) PV System Installation and Testing, and 3) Site Clean-up and Restoration. The proposed project would consume energy resources during construction in three (3) general forms:

- 1. Petroleum-based fuels used to power off-road construction vehicles and equipment on the project site, construction worker travel to and from the project site, as well as delivery and haul truck trips (e.g., hauling of construction waste material to off-site reuse and disposal facilities);
- Electricity associated with the conveyance of water that would be used during project construction for dust control (supply and conveyance) and electricity to power any necessary

- lighting during construction, electronic equipment, or other construction activities necessitating electrical power; and,
- 3. Energy used in the production of construction materials, such as asphalt, steel, concrete, pipes, and manufactured or processed materials such as lumber and glass.

Construction-Related Electricity

During construction of the proposed project, electricity would be consumed to construct the new structures and infrastructure. Electricity would be supplied to the project site by IID and would be obtained from the existing electrical lines in the vicinity of the project site. The use of electricity from existing power lines rather than temporary diesel or gasoline powered generators would minimize impacts on energy use. Electricity consumed during project construction would vary throughout the construction period based on the construction activities being performed. Various construction activities include electricity associated with the conveyance of water that would be used during project construction for dust control (supply and conveyance) and electricity to power any necessary lighting during construction, electronic equipment, or other construction activities necessitating electrical power. Such electricity demand would be temporary, nominal, and would cease upon the completion of construction. Overall, construction activities associated with the proposed project would require limited electricity consumption that would not be expected to have an adverse impact on available electricity supplies and infrastructure. Therefore, the use of electricity during project construction would not be wasteful, inefficient, or unnecessary.

The proposed project would include installation of an approximately 1.8-mile-long overhead power line from the southern edge of the project site to the North Brawley Geothermal Power Plant substation, which would provide adequate capacity to handle the power generated and utilized by the proposed project. Where feasible, the new service installations and connections would be scheduled and implemented in a manner that would not result in electrical service interruptions to other properties. Compliance with County and IID guidelines and requirements would ensure that the proposed project fulfills its responsibilities relative to infrastructure installation, coordinates any electrical infrastructure removals or relocations, and limits any impacts associated with construction of the project. Construction of the project's electrical infrastructure is not anticipated to adversely affect the electrical infrastructure serving the surrounding uses or utility system capacity.

Construction-Related Petroleum Fuel Use

Petroleum-based fuel usage represents the highest amount of transportation energy potentially consumed during construction, which would be utilized by both off-road equipment operating on the project site and on-road automobiles transporting workers to and from the project site and on-road trucks transporting equipment and supplies to the project site.

The off-road equipment utilized during construction of the proposed project would consume 84,890 gallons of fuel. The on-road trips generated from construction of the proposed project would consume 77,046 gallons of fuel. As such, the combined fuel used from off-road construction equipment and on-road construction trips for the proposed project would result in the consumption of 161,935 gallons of petroleum fuel. This equates to 0.17 percent of the gasoline and diesel consumed annually in Imperial County. As such, the construction-related petroleum use would be nominal, when compared to current county-wide petroleum usage rates.

Construction activities associated with the proposed project would be required to adhere to all State and ICAPCD regulations for off-road equipment and on-road trucks, which provide minimum fuel

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efficiency standards. As such, construction activities for the proposed project would not result in the wasteful, inefficient, and unnecessary consumption of energy resources. Impacts regarding transportation energy would be less than significant.

6.2.2 Operations Energy

The on-going operation of the proposed project would require the use of energy resources for multiple purposes including, but not limited to, heating/ventilating/air conditioning (HVAC), lighting, and electronics. Energy would also be consumed during operations related to water usage and vehicle trips.

Operations-Related Electricity

Operation of the proposed project would result in consumption and production of electricity at the project site. The proposed PV solar panels will generate 97,333,333 kWh per year of electricity and operation of the project will use 1,946,667 kWh per year of electricity, which would result in the net generation of 95,386,667 kWh per year of electricity. This equates to 2.8 percent of the electricity consumed annually by IID. As such, the operations-related electricity use would provide a significant renewable resource for the IID and would help IID achieve the State' Renewable Portfolio Standards requirement for non-carbon sources of electricity. No impact would occur from electricity-related energy consumption from the proposed project.

Operations-Related Vehicular Petroleum Fuel Usage

Operation of the proposed project would result in increased consumption of petroleum-based fuels related to vehicular travel to and from the project site. The proposed project would consume 1,036 gallons of petroleum fuel per year from vehicle travel. This equates to 0.001 percent of the gasoline and diesel consumed in Imperial County annually. As such, the operations-related petroleum use would be nominal, when compared to current petroleum usage rates

It should be noted that, the proposed project would comply with all Federal, State, and County requirements related to the consumption of transportation energy and would provide a non-carbon source of electricity to power electric vehicles in Imperial County. Thus, impacts with regard transportation energy supply and infrastructure capacity would be less than significant and no mitigation measures would be required.

6.2.3 Compliance with State or Local Plans for Renewable Energy or Energy Efficiency

The purpose of the proposed project is the construction of a renewable energy and storage facility in Imperial County. Once in operation, it will decrease the need for energy from fossil fuel—based power plants in the state. The result would be a net increase in electricity resources available to the regional grid, generated from a renewable source. The proposed project would help California meet its Renewable Portfolio Standard of 60 percent of retail electricity sales from renewable sources by the end of 2030 and 100 percent by 2045. Additionally, the project would also be consistent with the County's General Plan Conservation and Open Space Element, Objective 9.2 which encourages renewable energy developments. Therefore, the project would directly support state and local plans for renewable energy development. The proposed project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency; therefore, no impact would occur.

6.3 Mineral Resources

The project site is not used for mineral resource production and the applicant is not proposing any form of mineral extraction. According to Figure 8: Imperial County Existing Mineral Resources of the Conservation and Open Space Element of the General Plan (County of Imperial 2016), no known mineral resources occur within the project site nor does the project site contain mapped mineral resources. Therefore, the proposed project would not result in the loss of availability of any known mineral resources that would be of value to the region and the residents of California nor would the proposed project result in the loss of availability of a locally important mineral resource.

Based on a review of the California Department Division of Oil, Gas, and Geothermal Resources Well Finder, there are two plugged and abandoned geothermal wells (Well No. 02590966 and 02590983) located in the central portion of the project site (APN 037-140-022) (California Department of Oil, Gas, and Geothermal Resources 2021). There is also one idle water well (Well No. 02591498) on the southwestern portion of the project site (APN 037-140-022). The proposed project would be designed to avoid the geothermal wells and water well and would result in no impact.

6.4 Noise

Information contained in this section is summarized from the *Noise Impact Analysis for the Brawley Solar Energy Facility Project* prepared by Vista Environmental. This report is included in Appendix I of this EIR. The following analyzes the potential noise emissions associated with the temporary construction activities and long-term operations of the proposed project and compares the noise levels to the County standards. Potential noise impacts from vibration and nearby airports is also analyzed below.

6.4.1 Construction-Related Noise

The construction activities for the proposed project are anticipated to include: 1) Site Preparation; 2) PV System Installation and Testing, and 3) Site Clean-up and Restoration. Noise impacts from construction activities associated with the proposed project would be a function of the noise generated by construction equipment, equipment location, sensitivity of nearby land uses, and the timing and duration of the construction activities. The nearest sensitive receptors to the project site are single-family homes located as near as 40 feet to the north side of the project site (near the northwest corner of the project site). There are also homes located on the east side of N Best Avenue that are as near as 120 feet east of the project site.

The General Plan Noise Element includes Construction Noise Standards that limits the noise created from construction equipment to 75 dB Leq, averaged over an eight (8) hour period at the nearest sensitive receptor. In addition, the Construction Noise Standards limit construction equipment operation to between the hours of 7 a.m. to 7 p.m., Monday through Friday, and 9 a.m. to 5 p.m. Saturday. No commercial construction operations are permitted on Sunday or holidays.

For each phase of construction, all construction equipment was analyzed based on being placed in the middle of the project site, which is based on the analysis methodology detailed in FTA Manual for a General Assessment. Since the County's construction noise standard is based on the noise level over an 8-hour period and in a typical day the proposed construction equipment would operate over the entire project site, the use of the methodology detailed in the FTA Manual for a General Assessment would provide a reasonable estimate of the construction-related noise levels created by the proposed project.

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Table 6-1 shows that greatest construction noise impacts would be as high as 53 dBA Leq during the PV system installation and testing phase at the nearest homes to the northwest, northeast, and southeast of the project site. All calculated construction noise levels shown in Table 6-1 are within the County's construction noise standard of 75 dBA and would also be below the existing ambient daytime noise levels in the vicinity of the nearby homes. Therefore, through adherence to the limitation of allowable construction times provided in the General Plan Noise Element, construction-related noise levels would not exceed any standards established in the General Plan or Noise Ordinance nor would construction activities create a substantial temporary increase in ambient noise levels from construction of the proposed project. Impacts would be less than significant.

Table 6-1. Construction Noise Levels at the Nearby Homes

Construction Phase	Construction Noise Level (dBA Leq) at:				
	Home to Northwest ¹	Home to Northeast ²	Home to Southeast ³		
Site Preparation	52	52	52		
PV System Installation and Testing	53	53	53		
Site Clean-Up and Restoration	52	52	52		
Construction Noise Threshold ⁴	75	75	75		
Ambient Daytime Noise Level	66.5	60.2	62.0		
Exceed Thresholds?	No	No	No		

¹The distance from the center of the project site to the home to the northwest was measured at 2,900 feet.

6.4.2 Operational-Related Noise

The proposed project would consist of the development of a solar facility with a BESS and a substation. Since the proposed project would be operated on an unstaffed basis and monitored remotely from the Brawley Geothermal Power Plant control room, operation of the proposed project would not typically generate any additional vehicle traffic on the nearby roadways. As such, potential noise impacts associated with the operations of the proposed project would be limited to onsite noise sources. The proposed PV solar panels do not create any operational noise, however the proposed BESS Enclosures (AC Unit noise), Power Conversion System, Power Distribution Center that would be located at the BESS, and auxiliary transformers, and Battery Step Up Transformer that would be located at the proposed substation are known sources of noise that have been analyzed below.

Both the General Plan Noise Element and Section 90702.00 provide the same noise level limits at the property line of the nearby homes of 50 dBA Leq-1hour between 7 a.m. and 10 p.m. and 45 dBA Leq-1hour between 10 p.m. and 7 a.m. When the ambient noise level is equal to or exceeds the above noise standards, the proposed noise source shall not exceed the ambient plus 3 dB Leq.

In order to determine the noise impacts from the operation of onsite noise making equipment, noise specifications from previously prepared noise reports were obtained and are shown in Table 6-2. The noise levels from each source were calculated through use of standard geometric spreading of noise from a point source with a drop-off rate of 6 dB for each doubling of the distance between the source and receiver (Appendix I of this EIR).

² The distance from the center of the project site to the homes to the northeast was measured at 2,900 feet.

³ The distance from the center of the project site to the home to the southeast was measured at 2,850 feet.

⁴ Construction Noise Threshold obtained from the General Plan Noise Element (County of Imperial, 2015). Source: Appendix I of this EIR

Table 6-2 shows that the proposed project's onsite operational noise from the anticipated onsite noise sources would not exceed the applicable noise standards at the nearby homes. Therefore, operational onsite noise impacts would be less than significant.

Table 6-2. Operational Noise Levels at the Nearby Homes

Noise Source	Home to N	lorthwest	Home to N	Home to Northeast Home to South		Southeast
	Distance - Source to Home (feet)	Noise Level ¹ (dBA Leq)	Distance - Source to Home (feet)	Noise Level ¹ (dBA Leq)	Distance - Source to Home (feet)	Noise Level ¹ (dBA Leq)
BESS Enclosures ²	5,050	25	5,100	25	850	40
Power Conversion System ³	5,050	22	5,100	22	850	38
Power Distribution Center ⁴	5,050	22	5,100	22	850	38
Auxiliary Transformers ⁵	5,030	31	5,280	31	1,150	44
Battery Step up Transformer ⁶	5,030	31	5,280	31	850	47
Combined Noise Levels	35		35		50	
County Noise Standard ⁷ (day/night)		69.5/67.9		63.2/58.6		65.0/59.2
Exceed County Noise Standards?		No/No		No/No		No/No

Notes

Source: Appendix I of this EIR

6.4.3 Construction-Related Vibration Impacts

Vibration impacts from construction activities associated with the proposed project would typically be created from the operation of heavy off-road equipment. The nearest sensitive receptor to the project site is a single-family home located as near as 40 feet to the north side of the project site (near the northwest corner of the project site).

Since neither the Municipal Code nor the General Plan provides any thresholds related to vibration, Caltrans guidance has been utilized, which defines the threshold of perception from transient sources at 0.25 inch per second PPV.

The primary source of vibration during construction would be from the operation of a bulldozer. A large bulldozer would create a vibration level of 0.089 inch per second PPV at 25 feet. Based on typical propagation rates, the vibration level at the nearest home (40 feet away) would be 0.06 inch per second PPV (Appendix I of this EIR). The vibration level at the nearest home, would be below the 0.25 inch per second PPV threshold detailed above. Impacts would be less than significant.

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¹ The noise levels were calculated through use of standard geometric spreading of noise from a point source with a drop-off rate of 6 dB for each doubling of the distance between the source and receiver.

² BESS Enclosures is based on a reference noise measurement of 88.6 dBA at 1 meter.

³ Power Conversion System is based on a reference noise measurement of 86.1 dBA at 1 meter.

⁴ Power Distribution Center is based on a reference noise measurement of 86.1 dBA at 1 meter.

⁵ Auxiliary Transformers are based on a reference noise measurement of 95.1 dBA at 1 meter.

⁶ Battery Step up Transformer is based on a reference noise measurement of 95.1 dBA at 1 meter.

County Noise Standard based on ambient noise level shown in Table D plus 3 dB at the nearby homes.

6.4.4 Operations-Related Vibration Impacts

The proposed project would consist of the operation of a solar energy facility. The on-going operation of the proposed project would not include the operation of any known vibration sources. Therefore, a less than significant vibration impact is anticipated from the operation of the proposed project.

6.4.5 Airport Noise

The project site is located within 2 miles of a public airport. The nearest airport is the Brawley Municipal Airport located approximately 1.5 miles south of the project site. However, the project site is outside of the airport compatibility zones of the Brawley Municipal Airport (County of Imperial 1996). Therefore, the proposed project would not expose people residing or working in the project area to excess noise levels and no impact is identified for this issue area.

6.5 Population and Housing

Development of housing is not proposed as part of the project. The unemployment rate in Imperial County, as of August 2021 was 19.4 percent (State of California Employment Development Department 2021b). The applicant expects to utilize construction workers from the local and regional area, a workforce similar to that involved in the development of other utility-scale solar facilities. Based on the unemployment rate in Imperial County (19.4 percent) (State of California Employment Development Department 2021b), and the availability of the local workforce, construction of the proposed project would not have a growth-inducing effect.

Once fully constructed, the project would be operated on an unstaffed basis and be monitored remotely, with periodic on-site personnel visitations for security, maintenance and system monitoring. Therefore, no full-time site personnel would be required on-site during operations and approximately two employees would only be onsite up to four times per year to wash the solar panels. As the project's PV arrays produce electricity passively, maintenance requirements are anticipated to be very minimal. Therefore, the proposed project would not result in a substantial growth in the area, as the number of employees required to operate and maintain the facility is minimal.

No housing exists within the project site and no people reside within the project site. Therefore, the proposed project would not displace substantial numbers of people or housing, necessitating the construction of replacement housing elsewhere. The proposed project would result in no impact to population and housing.

6.6 Public Services

Schools. The proposed project does not include the development of residential land uses that would result in an increase in population or student generation. Construction of the proposed project would not result in an increase in student population within the Imperial County's School District since it is anticipated that construction workers would commute in during construction operations. The proposed project would have no impact on Imperial County schools.

Parks and Other Public Facilities. No full-time employees are required to operate the project. The project facility will be monitored remotely. It is anticipated that maintenance of the facility will require minimal site presence to perform periodic visual inspections and minor repairs. Therefore, substantial permanent increases in population that would adversely affect local parks, libraries, and other public

facilities are not expected. The project is not expected to have an impact on parks, libraries, and other public facilities.

6.7 Recreation

The project site is not used for formal recreational purposes. Also, the proposed project would not generate new employment on a long-term basis. As such, the project would not significantly increase the use or accelerate the deterioration of regional parks or other recreational facilities. Up to 120 construction workers are expected to be on-site per day. The temporary increase of population during construction that might be caused by an influx of workers would be minimal and not cause a detectable increase in the use of parks. Additionally, the project does not include or require the expansion of recreational facilities. Therefore, no impact is identified for recreation.

6.8 Utilities and Service Systems

Wastewater Facilities. The project would generate a minimal volume of wastewater during construction. During construction activities, wastewater would be contained within portable toilet facilities and disposed of at an approved site. No habitable structures are proposed on the project site, such as O&M buildings; therefore, there would be no wastewater generation from the proposed project. The proposed project would not require or result in the relocation or construction of new or expanded wastewater facilities.

Storm Water Facilities. The proposed project will involve the construction of drainage control facilities within the project site, and included in the project impact footprint, of which environmental impacts have been evaluated. Otherwise, the project does not require expanded or new storm drainage facilities off-site (i.e., outside of the project footprint) because the proposed solar facility would not generate a significant increase in the amount of impervious surfaces that would increase runoff during storm events, and therefore, would not require the construction of off-site storm water management facilities. Water from solar panel washing would continue to percolate through the ground, as a majority of the surfaces within the project site would remain pervious. The proposed project would not require or result in the relocation or construction of new or expanded storm water facilities beyond those proposed as part of the project and evaluated in the EIR.

Water Facilities. The proposed project is not anticipated to result in a significant increase in water demand/use during operation; however, water will be needed for solar panel washing and dust suppression. During operation, water would be trucked to the project site from a local water source. Therefore, the proposed project would not require or result in the relocation or construction of new or expanded water facilities.

Power, Natural Gas, and Telecommunication Facilities. The proposed project would involve construction of power facilities. However, these are components of the project as evaluated in the EIR. The proposed project would not otherwise generate the demand for or require or result in the relocation or construction of new or expanded electric power, natural gas, or telecommunications facilities that would in turn, result in a significant impact to the environment.

Solid Waste Facilities. Solid waste generation would be minor for the construction and operation of the project. Solid waste would be disposed of using a locally-licensed waste hauling service, most likely Allied Waste. Trash would likely be hauled to the Imperial Landfill (13-AA-0019) located approximately 11 miles south of the proposed project in Imperial. The Imperial Landfill has approximately 12,384,000 cubic yards of remaining capacity and is estimated to remain in operation

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through 2040 (CalRecycle 2021). Therefore, there is ample landfill capacity in the County to receive the minor amount of solid waste generated by construction and operation of the proposed project.

Additionally, because the proposed project would generate solid waste during construction and operation, the project would be required to comply with state and local requirements for waste reduction and recycling; including the 1989 California Integrated Waste Management Act and the 1991 California Solid Waste Reuse and Recycling Access Act of 1991. Also, conditions of the CUP would contain provisions for recycling and diversion of Imperial County construction waste policies.

Further, when the proposed project reaches the end of its operational life, the components would be decommissioned and deconstructed. When the project concludes operations, much of the wire, steel, and modules of which the system is comprised would be recycled to the extent feasible. The project components would be deconstructed and recycled or disposed of safely, and the site could be converted to other uses in accordance with applicable land use regulations in effect at the time of closure. Commercially reasonable efforts would be used to recycle or reuse materials from the decommissioning. All other materials would be disposed of at a licensed facility. A less than significant impact is identified for this issue.

6.9 Wildfire

According to the Draft Fire Hazard Severity Zone Map for Imperial County prepared by the California Department of Forestry and Fire Protection, the project site is not located in or near state responsibility areas or lands classified as very high hazard severity zones (California Department of Forestry and Fire Protection 2007). Therefore, the proposed project would not substantially impair an adopted emergency response plan or emergency evacuation plan; expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire; exacerbate fire risk; or, 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 is identified for wildfire.

6 Effects Found Not Significant Final EIR | Brawley Solar Energy Facility Project

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7 Alternatives

7.1 Introduction

The identification and analysis of alternatives is a fundamental concept under CEQA. This is evident in that the role of alternatives in an EIR is set forth clearly and forthrightly within the CEQA statutes. Specifically, CEQA §21002.1(a) states:

"The purpose of an environmental impact report is to identify the significant effects on the environment of a project, to identify alternatives to the project, and to indicate the manner in which those significant effects can be mitigated or avoided."

The CEQA Guidelines require an EIR to "describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives" (CEQA Guidelines §15126.6(a)). The CEQA Guidelines direct that selection of alternatives focus on those alternatives capable of eliminating any significant environmental effects of the project or of reducing them to a less-than significant level, even if these alternatives would impede to some degree the attainment of project objectives, or would be more costly. In cases where a project is not expected to result in significant impacts after implementation of recommended mitigation, review of project alternatives is still appropriate.

The range of alternatives required within an EIR is governed by the "rule of reason" which requires an EIR to include only those alternatives necessary to permit a reasoned choice. The discussion of alternatives need not be exhaustive. Furthermore, an EIR need not consider an alternative whose implementation is remote and speculative or whose effects cannot be reasonably ascertained.

Alternatives that were considered but were rejected as infeasible during the scoping process should be identified along with a reasonably detailed discussion of the reasons and facts supporting the conclusion that such alternatives were infeasible.

Based on the alternatives analysis, an environmentally superior alternative is designated among the alternatives. If the environmentally superior alternative is the No Project Alternative, then the EIR shall identify an environmentally superior alternative among the other alternatives (CEQA Guidelines §15126.6(e)(2)).

7.2 Criteria for Alternatives Analysis

As stated above, pursuant to CEQA, one of the criteria for defining project alternatives is the potential to attain the project objectives. Established objectives of the project applicant for the proposed project include:

- Construct, operate and maintain an efficient, economic, reliable, safe and environmentally sound solar-powered electricity generating facility.
- Help meet California's Renewable Portfolio Standard (RPS) requirements, which require that by 2030, California's electric utilities are to obtain 50 percent of the electricity they supply from renewable sources.

- Generate renewable solar-generated electricity from proven technology, at a competitive cost, with low environmental impact, and deliver it to the local markets as soon as possible.
- Develop, construct, own and operate the Brawley Solar Energy Facility, and ultimately sell its
 electricity and all renewable and environmental attributes to an electric utility purchaser under
 a long-term contract to meet California's RPS goals.
- Utilize a location that is in close proximity to an existing switching station and powerlines.
- Minimize and mitigate any potential impact to sensitive environmental resources within the project area.

7.3 Alternatives Considered but Rejected

7.3.1 Alternative Site

Section 15126.6(f)(2) of the CEQA Guidelines addresses alternative locations for a project. The key question and first step in the analysis is whether any of the significant effects of the proposed project would be avoided or substantially lessened by constructing the proposed project in another location. Only locations that would avoid or substantially lessen any of the significant effects of the project need to be considered for inclusion in the EIR. Further, CEQA Guidelines Section 15126.6(f)(1) states that among the factors that may be taken into account when addressing the feasibility of alternative locations are whether the project proponent can reasonably acquire, control or otherwise have access to the alternative site (or the site is already owned by the proponent).

With respect to the proposed project, no significant, unmitigable impacts have been identified. With implementation of proposed mitigation, all potentially significant environmental impacts will be mitigated to a level less than significant.

The Applicant investigated the opportunity to develop the project site in the general project area and determined that the currently proposed project site is the most suitable for development of the solar facility. An alternative site was considered and is depicted on Figure 7-1. As shown, this site is located south of the project site on privately-owned agricultural lands, similar to the project site. The site, located on APNs 037-160-017, 037-160-018, and 037-160-019 totals approximately 282 acres of land.

However, this site was rejected from detailed analysis for the following reasons:

The alternative location site, as compared to the proposed project site, is located immediately north of State Route 78, a major US State Highway traversed by large numbers of transient public viewers. When compared to the proposed project, the alternative site would result in potentially significant impacts associated with aesthetics and visual quality. While the proposed project identified no significant impacts for aesthetics and visual quality, implementation of the project at the alternative location site has the potential to permanently alter the existing visual character and visual quality of the alternative site, which is characterized by agricultural lands and minor agricultural development under existing viewer locations from SR 78, looking north. As such, aesthetic impacts at the alternative location site, adjacent to SR 78, would be greater than those at the proposed project site, which is located adjacent to small, less-traveled, agricultural roads (N Best Road and Baughman Road), approximately 0.7 mile east of the major thoroughfare, SR 111.

Similarly, a glare hazard analysis prepared for the project (Appendix B of this EIR) concluded that sensitive viewers near the proposed project, including residences, a nearby golf course,

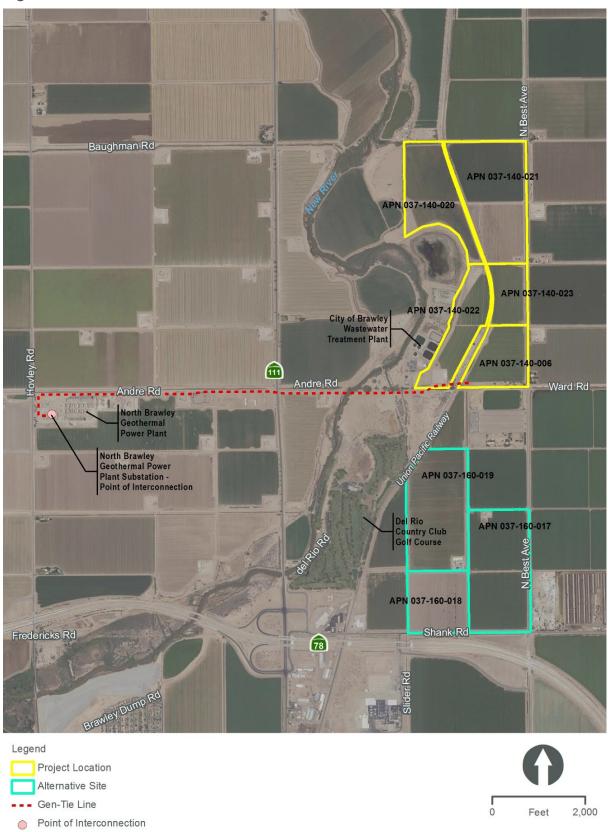
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major roadways, and approach slopes associated with the Brawley Municipal Airport, would not experience glare effects from the project. Comparatively, due to the alternative site location's close proximity immediately north of SR 78, potential glare impacts resulting from the solar array would be potentially significant to viewers traveling on SR 78.

- The alternative location site, as compared to the proposed project site, is bisected by the Shellenberger Drain. With the implementation of mitigation, impacts on surface water quality as attributable to the proposed project, which has been designed to avoid bisecting any waterways, would be reduced to a less than significant level. However, construction activities at the alternative site location have the potential to impact hydrology and water quality (due to the presence of the Shellenberger Drain) when compared to the proposed project site.
- No significant, unmitigated impacts have been identified for the proposed project. Construction
 and operation of the proposed project at this alternative location would likely result in similar
 impacts associated with the proposed project, or additional impacts (to hydrology and water
 quality) that are currently not identified for the project at the currently proposed location.

As such, the County considers this alternative location infeasible and rejects further analysis of this alternative because of the factors listed above.

Figure 7-1. Alternative Site



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7.4 Alternative 1: No Project/No Development Alternative

The CEQA Guidelines require analysis of the No Project Alternative (PRC Section 15126). According to Section 15126.6(e)(1), "the specific alternative of 'no project' shall also be evaluated along with its impact." Also, pursuant to Section 15126.6(e)(2); "The 'no project' analysis shall discuss the existing conditions at the time the notice of preparation is published, ... at the time environmental analysis is commenced, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services."

The No Project/No Development Alternative assumes that the project, as proposed, would not be implemented and the project site would not be further developed with a solar energy project. The No Project/No Development Alternative would not meet a majority of the project objectives.

7.4.1 Environmental Impact of Alternative 1: No Project/No Development Alternative

Aesthetics

Under the No Project/No Development Alternative, the project site would not be developed and would continue to be agricultural land. The No Project/No Development Alternative would not modify the existing project site or add construction to the project site; therefore, there would be no change to the existing condition of the site. Under this alternative, there would be no potential to create a new source of light or glare associated with the PV arrays. As discussed in greater detail in Section 3.2, Aesthetics, the proposed project would result in a less than significant impact associated with introduction of new sources of light and glare. Under the No Project Alternative, no new sources of light, glare, or other aesthetic impacts would occur. Under this alternative, light, glare, and aesthetic impacts would be less compared to the project as the existing visual conditions would not change.

Agricultural Resources

Under the No Project/No Development Alternative, the project site would not be developed and would continue to be agricultural land. Compared to the proposed project, implementation of this alternative would avoid the conversion of land designated as Prime Farmland (4.44 acres) and Farmland of Statewide Importance (204.95 acres) per the Farmland Mapping and Monitoring Program (FMMP). Therefore, this alternative would not contribute to the conversion of agricultural lands or otherwise adversely affect agricultural operations. Compared to the proposed project, this alternative would avoid the need for future restoration of the project site to pre-project conditions. This alternative would avoid any agricultural impacts associated with the proposed project.

Air Quality

Under the No Project/No Development Alternative, there would be no air emissions associated with project construction or operation, and no project- or cumulative-level air quality impact would occur. Therefore, no significant impacts to air quality or violation of air quality standards would occur under this alternative. Moreover, this alternative would be consistent with existing air quality attainment plans and would not result in the creation of objectionable odors.

As discussed in Section 3.4, Air Quality, the proposed project would not exceed the ICAPCD's significance thresholds for emissions of ROG, CO, NOx, and PM₁₀ during both the construction and

operational phases of the project. Although no significant air quality impacts would occur, all construction projects within Imperial County must comply with the requirements of ICAPCD Regulation VIII for the control of fugitive dust. In addition, the ICAPCD's Air Quality Handbook lists additional feasible mitigation measures that may be warranted to control emissions of fugitive dust and combustion exhaust.

This alternative would result in less air quality emissions compared to the proposed project, the majority of which would occur during construction.

Biological Resources

Under the No Project/No Development Alternative, existing biological resource conditions within the project site would largely remain unchanged and no impact would be identified. Unlike the proposed project which requires mitigation for biological resources including burrowing owl and other migratory birds, this alternative would not result in construction of a solar facility that could otherwise result in significant impacts to these biological resources. Compared to the proposed project, this alternative would avoid impacts to biological resources.

Cultural Resources

The proposed project would involve ground-disturbing activities that have the potential to disturb previously undocumented cultural resources that could qualify as historical resources or unique archaeological resources pursuant to CEQA. Under the No Project/No Development Alternative, the project site would not be developed and no construction-related ground disturbance would occur. Therefore, compared to the proposed project, this alternative would avoid impacts to cultural resources.

Geology and Soils

Because there would be no development at the project site under the No Project/No Development Alternative, no grading or construction of new facilities would occur. Therefore, there would be no impact to project-related facilities as a result of local seismic hazards (strong ground shaking), soil erosion, and paleontological resources. In contrast, the proposed project would require the incorporation of mitigation measures related to potential seismic hazards, soil erosion, and paleontological resources to minimize impacts to a less than significant level. Compared to the proposed project, this alternative would avoid significant impacts related to local geology and soil conditions and paleontological resources.

Greenhouse Gas Emissions

Under the No Project/No Development Alternative, there would be no GHG emissions resulting from project construction or operation or corresponding impact to global climate change. The No Project/No Development Alternative would not help California meet its statutory and regulatory goal of increasing renewable power generation, including GHG reduction goals of SB 32. While this alternative would not further implement policies (e.g., SB X1-2) for GHG reductions, this alternative would also not directly conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. This alternative would not create any new GHG emissions during construction but would not lead to a long-term beneficial impact to global climate change by providing renewable clean energy. For the proposed project, a less than significant impact was identified for construction-related GHG emissions, and in the long-term, the project would result in an overall

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beneficial impact to global climate change as the result of creation of clean renewable energy, that does not generate GHG emissions. Compared to the proposed project, while the No Project/No Development Alternative would not result in new GHG emissions during construction, it would be less beneficial to global climate change as compared to the proposed project. Further, the construction emissions (amortized over 30 years) associated with the project would be off-set by the beneficial renewable energy provided by the project, negating any potential that the No Project/No Development alternative would reduce construction-related GHG emissions.

Hazards and Hazardous Materials

The No Project/No Development Alternative would not include any new construction. Therefore, no potential exposure to hazardous materials would occur. Therefore, no impact is identified for this alternative for hazards and hazardous materials. As with the proposed project, this alternative would not result in safety hazards associated with airport operations. Compared to the proposed project, this alternative would have less of an impact related to hazards and hazardous materials.

Hydrology/Water Quality

The No Project/No Development Alternative would not result in modifications to the existing drainage patterns or volume of storm water runoff as attributable to the proposed project, as the existing site conditions and on-site pervious surfaces would remain unchanged. In addition, no changes with regard to water quality would occur under this alternative. Compared to the proposed project, from a drainage perspective, this alternative would avoid changes to existing hydrology. Like the proposed project, this alternative would not result in the placement of structures within a 100-year flood zone. Under this alternative, there would be no water demand. This alternative would have less of an impact associated with hydrology/water quality as compared to the proposed project.

Land Use/Planning

As discussed in Section 3.11, Land Use/Planning, the proposed project would not physically divide an established community or conflict with applicable plans, policies, or regulations.

Under the No Project/No Development Alternative, the project site would not be developed and continue to be agricultural land. Current land uses would remain the same. No General Plan Amendment, Zone Change, or CUP would be required under this alternative. No existing community would be divided, and no inconsistencies with planning policies would occur. Because no significant Land Use and Planning impact has been identified associated with the proposed project, this alternative would not avoid or reduce a significant impact related to this issue and therefore, it is considered similar to the proposed project.

Public Services

The No Project/No Development Alternative would not increase the need for public services which would otherwise be required for the proposed project (additional police or fire protection services). Therefore, no impact to public services is identified for this alternative. The proposed project will result in less than significant impacts; subject to payment of law enforcement and fire service fees. Compared to the proposed project, this alternative would have fewer impacts related to public services as no new development would occur on the project site.

Transportation

There would be no new development under the No Project/No Development Alternative. Therefore, this alternative would not generate vehicular trips during construction or operation. For these reasons, no impact would occur and this alternative would not impact any applicable plan, ordinance, or policy addressing the performance of the circulation system, substantially increase hazards because of a design feature, result in inadequate emergency access, or conflict with public transit, bicycle, or pedestrian facilities. Although the proposed project would result in less than significant transportation/traffic impacts, this alternative would avoid an increase in vehicle trips on local roadways, and any safety related hazards that could occur in conjunction with the increase vehicle trips and truck traffic, primarily associated with the construction phase of the project.

Tribal Cultural Resources

As discussed in Section 3.6, Cultural Resources, no tribes have responded that indicate the potential for traditional cultural properties or sacred sites on the project site. Therefore, the project is not anticipated to cause a substantial adverse change in the significance of a tribal cultural resource. Impacts to tribal cultural resources under the No Project/No Development Alternative are similar to the proposed project.

Utilities and Service Systems

The No Project/No Development Alternative would not require the expansion or extension of existing utilities, since there would be no new project facilities that would require utility service. No solid waste would be generated under this alternative. The proposed project would not result in any significant impacts to existing utilities or solid waste facilities. Compared to the proposed project, this alternative would have less of an impact related to utilities and solid waste facilities.

Conclusion

Implementation of the No Project/No Development Alternative would generally result in reduced impacts for a majority of the environmental issues areas considered in Chapter 3, Environmental Analysis when compared to the proposed project. A majority of these reductions are realized in terms of significant impacts that are identified as a result of project construction. However, this alternative would not realize the benefits of reduced GHG emissions associated with energy use, which are desirable benefits that are directly attributable to the proposed project.

Comparison of the No Project/No Development Alternative to Project Objectives

The No Project/No Development Alternative would not meet a majority of the objectives of the project. Additionally, the No Project/No Development Alternative would not help California meet its statutory and regulatory goal of increasing renewable power generation, including GHG reduction goals of SB 32.

7.5 Alternative 2: Development within Renewable Energy Overlay Zone – Agricultural Lands

In certain cases, an evaluation of an alternative location in an EIR is necessary. Section 15126.6(f)(2)(A) of the CEQA Guidelines states, "Key question. The key question and first step in analysis is whether any of the significant effects of the project would be avoided or substantially

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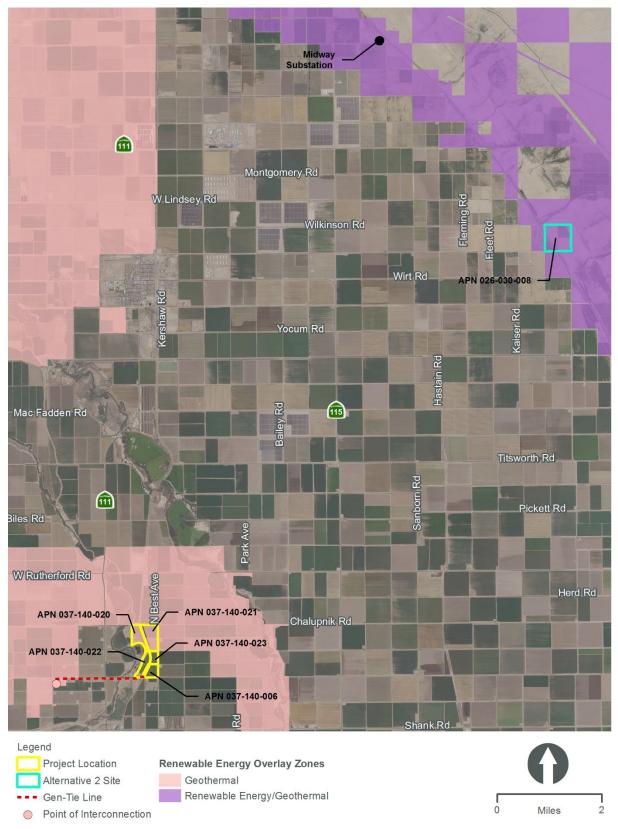
lessened by putting the project in another location. Only locations that would avoid or substantially lessen any of the significant effects of the project need be considered for inclusion in the EIR."

Given that Because the southern three parcels of the proposed project is are not located within the County's RE Overlay Zone, the purpose of this alternative is to develop a project alternative within the existing boundary of County's RE Overlay Zone. The RE Overlay Zone is concentrated in areas determined to be the most suitable for the development of renewable energy facilities while minimizing the impact on other established areas.

As shown on Figure 7-2, the Alternative 2 project site is located entirely within the RE Overlay Zone. Alternative 2 would involve the construction and operation of a 40 MW solar energy facility and associated infrastructure on an approximately 231-acre parcel (APN 026-030-008) located approximately 11 miles northeast of Brawley in unincorporated Imperial County. The Alternative 2 project site is designated as Agriculture under the County's General Plan and zoned S-2-RE and A-3-RE (Open Space/Preservation and Heavy Agriculture, both within the RE Overlay Zone).

Similar to the proposed project, Alternative 2 would require approval of a CUP to allow for the construction and operation of a solar project. However, compared to the proposed project, the Alternative 2 project site is located within the RE Overlay Zone and, as such, would not require a General Plan Amendment or Zone Change to include/classify the project site into the RE Overlay Zone. Additionally, while the proposed project (A-2-G Zone) would not require a Variance, the S-2-RE Zone associated with the Alternative 2 site allows a maximum height limit of 40 feet for non-residential structures and 100 feet for communication towers. As such, a Variance would be required under this alternative because the proposed height of the transmission towers (66 feet) and microwave tower (maximum of 100 feet) would exceed 40 feet. This alternative's gen-tie line could potentially interconnect to IID's existing Midway Substation located approximately 4.75 miles northwest of the solar facility. Consultation and coordination with IID would be required to determine if the Midway Substation has existing capacity or would require upgrades for this alternative's interconnection.

Figure 7-2. Alternative 2: Development within Renewable Energy Overlay Zone – Agricultural Lands



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7.5.1 Environmental Impact of Alternative 2: Development within Renewable Energy Overlay Zone – Agricultural Lands

Aesthetics

Compared to the proposed project site, the Alternative 2 project site is comprised of both agricultural and open space lands. Similar to the proposed project, Alternative 2 would alter the existing visual character of the project site by changing the existing land use at the project site from undeveloped open space and/or agricultural to a solar facility. However, the Alternative 2 project site is located approximately 11 miles northeast of Brawley in a relatively remote location. As such, potential impacts to aesthetics would be reduced under Alternative 2 when compared to the proposed project due to the lack of public viewer locations.

Agricultural Resources

The Alternative 2 site is designated Farmland of Statewide Importance by the FMMP. Compared to the proposed project, Alternative 2 does not contain Prime Farmland and would avoid the impact to approximately 4.44 acres of Prime Farmland. However, this alternative would still result in the temporary conversion of Farmland of Statewide Importance (approximately 231 acres). Therefore, mitigation would still be required for this alternative to reduce significant farmland impacts to a less than significant level. Compared to the proposed project, development of the Alternative 2 site would have less impacts on agricultural resources because it would avoid the temporary conversion of Prime Farmland to non-agricultural uses.

Air Quality

Similar to the proposed project, a 40 MW solar energy facility would be constructed on approximately 231 acres of land. Based on this consideration, this alternative would generate air emissions similar to the proposed project. As discussed in Section 3.4, Air Quality, the proposed project would not exceed the ICAPCD's significance thresholds for ROG, CO, NOx, and PM₁₀ during construction and operation. Although no significant air quality impacts would occur, all construction projects within Imperial County must comply with the requirements of ICAPCD Regulation VIII for the control of fugitive dust. In addition, the ICAPCD's Air Quality Handbook lists additional feasible mitigation measures that may be warranted to control emissions of fugitive dust and combustion exhaust. This alternative would result in similar air quality emissions as the proposed project. Similar to the proposed project, this alternative would result in temporary odor emissions from construction equipment.

Biological Resources

Similar to the proposed project, the Alternative 2 site is located on agricultural fields, which provide habitat for burrowing owl. Irrigation canals and drains are commonly used as burrowing nesting sites in the Imperial Valley. This alternative would also require the construction of supporting infrastructure that has the potential to result in biological impacts. Compared to the proposed project, this alternative would result in similar biology impacts.

Cultural Resources

This alternative would require the construction of supporting infrastructure (i.e., transmission towers, substation) that would require ground disturbance and therefore, has the potential to result in cultural resources impacts. Compared to the proposed project, which is located on active agricultural land that

has been previously disturbed, the Alternative 2 site is predominantly located on open space land. As such, although this alternative would attempt to avoid cultural resources to the extent feasible, depending on the route of the proposed gen-tie line, Alternative 2 could result in greater impacts to previously undiscovered cultural resources.

Geology and Soils

Grading and construction of new facilities, such as the solar facility and gen-tie line, would still occur under this alternative. Similar to the proposed project, Alternative 2 would result in potentially significant impacts related to strong ground shaking, soil erosion, and paleontological resources and would require the incorporation of mitigation measures to minimize these impacts to a less than significant level. This alternative would result in similar geology and soil and paleontological resources impacts as the proposed project.

Greenhouse Gas Emissions

This alternative would result in the same power production capacity as the proposed project; hence, the overall benefits of the project to global climate change through the creation of renewable energy would be the same. Alternative 2 would not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases. This alternative would contribute similar and desirable benefits to reductions in global climate change through the production of renewable energy.

Hazards and Hazardous Materials

Depending on the specific locations and conditions of the Alternative 2 project site that would need to be developed, certain hazards and hazardous materials may be encountered. The Alternative 2 project site may need to be remediated before implementation of the alternative. Overall, the degree of impact associated with hazards and hazardous materials would likely be similar to the proposed project.

Hydrology/Water Quality

With implementation of the proposed mitigation measures, potential hydrology/water quality impacts under the proposed project would be less than significant. Comparatively, the Alternative 2 site is bisected by the Mammoth Wash and the gen-tie alignment is longer, and, as such, construction activities have the potential to impact hydrology and water quality to a greater extent than would occur under the proposed project. Similar to the proposed project, no impacts would result from flooding and facilities will not be placed within floodplains.

Land Use/Planning

The Alternative 2 project site is located within the RE Overlay Zone and would not require a General Plan Amendment or Zone Change to include/classify the project site into the RE Overlay Zone. Similar to the proposed project, Alternative 2 will require approval of a CUP to allow for the construction and operation of a solar project. Additionally, while the proposed project (A-2-G Zone) would not require a Variance, the S-2-RE Zone associated with the Alternative 2 site allows a maximum height limit of 40 feet for non-residential structures and 100 feet for communication towers. As such, a Variance would be required under this alternative because the proposed height of the transmission towers (70 feet) and microwave tower (maximum of 100 feet) would exceed 40 feet. With approval of the CUP and

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Variance, the alternative would not conflict with the County's zoning ordinance. Therefore, land use and planning impacts are anticipated to be similar to the proposed project.

Public Services

Alternative 2 would require increased public services, specifically law enforcement and fire protection services. While the solar facility footprint would be slightly smaller (reduced by approximately 4 acres), the impacts of this alternative to public services and associated service ratios would be similar. Like the proposed project, this alternative would be conditioned to provide law enforcement and fire service development impact fees. Therefore, this alternative would result in a similar impact related to public services as the proposed project.

Transportation

This alternative would result in a similar level of construction and operation-related vehicle and truck trips as compared to the proposed project. However, the increase in vehicular traffic was identified as a less than significant impact for the proposed project. In this context, Alternative 2 would not reduce or avoid an impact related to transportation/traffic, and would result in less than significant impacts similar to the proposed project. As with the proposed project, Alternative 2 would not impact any applicable plan, ordinance, or policy addressing the performance of the circulation system, substantially increase hazards because of a design feature, result in inadequate emergency access, or conflict with public transit, bicycle, or pedestrian facilities. This alternative would result in a similar impact related to transportation as the proposed project.

Tribal Cultural Resources

This alternative would require the construction of supporting infrastructure (i.e., transmission towers, substation) that would require ground disturbance and therefore, has the potential to result in tribal cultural resources impacts. Although this alternative would attempt to avoid impacts on tribal cultural resources to the extent feasible, depending on the route of the proposed gen-tie line, Alternative 2 could result in greater impacts to tribal cultural resources.

Utilities and Service Systems

During construction of this alternative, impacts would be similar to the proposed project in terms of water demand (for dust control) and solid waste generation. Similar to the proposed project, Alternative 2 would require similar levels of water demand and energy for the operation of the solar facility. As with the proposed project, panel washing and other maintenance would be required. This alternative would have similar water demands and associated impacts related to utilities and service systems.

Conclusion

As shown on Table 7-1, this alternative would result in reduced aesthetics and agricultural resources impacts compared to the proposed project. This alternative would result in greater impacts for the following environmental issue areas as compared to the proposed project: cultural resources, hydrology and water quality, and tribal cultural resources.

Comparison of Alternative 2: Development within Renewable Energy Overlay Zone – Agricultural Lands to Project Objectives

Alternative 2 would meet most of the basic objectives of the proposed project and should remain under consideration. However, this alternative would result in greater impacts for the following environmental issue areas as compared to the proposed project: cultural resources, hydrology and water quality, and tribal cultural resources. Further, the project applicant does not own, or otherwise control this property.

7.6 Alternative 3: Development within Renewable Energy Overlay Zone – Desert Lands

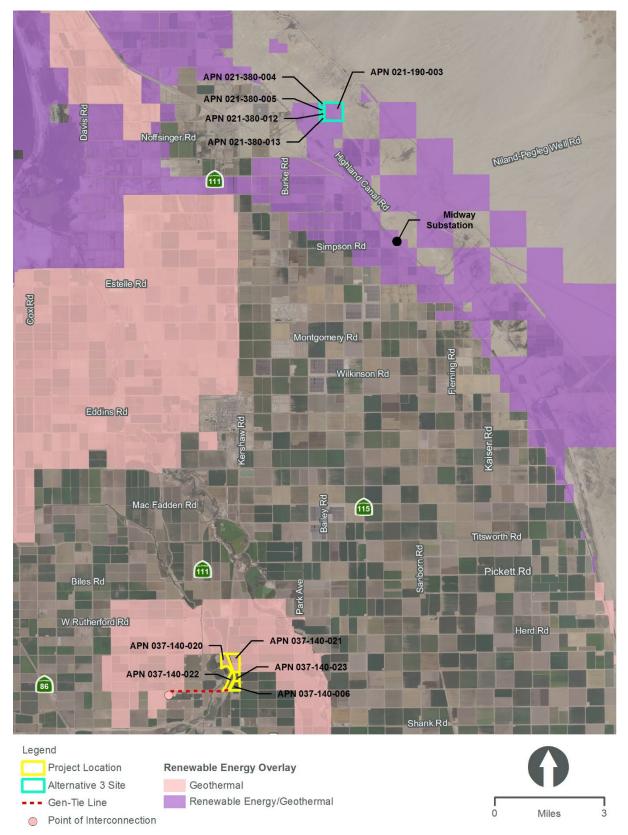
The purpose of this alternative is to develop the proposed project within the existing boundary of the County's RE Overlay Zone. As shown on Figure 7-3, the Alternative 3 project site is located entirely within the RE Overlay Zone. Alternative 3 would involve the construction and operation of a solar energy facility and associated infrastructure on five parcels totaling approximately 288 acres (APN 021-190-003; 021-380-004; 021-380-005; 021-380-012; and 021-380-013) located approximately 0.5 mile south of Slab City. This alternative is 61 acres larger than the proposed project site. Therefore, more solar panels could be installed on this site compared to the proposed project. The Alternative 3 project site is located on undeveloped desert land. Existing transmission lines traverse the southwest corner of the project site.

The Alternative 3 project site is located within the RE Overlay Zone and would not require a General Plan Amendment or Zone Change to include/classify the project site into the RE Overlay Zone. The Alternative 3 project site is designated as Recreation under the County's General Plan and zoned General Agricultural with a renewable energy overlay (A-2-RE).

Similar to the proposed project, Alternative 3 will require approval of a CUP to allow for the construction and operation of a solar project. Compared to the proposed project, the Alternative 3 project site is located within the RE Overlay Zone and would not require a General Plan Amendment or Zone Change to include/classify the project site into the RE Overlay Zone. Similar to the proposed project site, the A-2-RE zone allows a maximum height limit of 120 feet for non-residential structures. No Variance would be required under this alternative because the proposed height of the transmission towers (66 feet) would not exceed 120 feet. This alternative's gen-tie line could potentially interconnect to IID's existing Midway Substation located approximately 4 miles southeast of the solar facility. Consultation and coordination with IID would be required to determine if the Midway Substation has existing capacity or would require upgrades for this alternative's interconnection.

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Figure 7-3. Alternative 3: Development within Renewable Energy Overlay Zone – Desert Lands



7.6.1 Environmental Impact of Alternative 3: Development within Renewable Energy Overlay Zone – Desert Lands

Aesthetics

While the proposed project site is located on active agricultural land, the Alternative 3 project site is located on undeveloped desert land. However, the Alternative 3 project site is located in closer proximity (approximately 0.5 mile) to Slab City and Salvation Mountain. Slab City is a former military facility that now serves as the site of an informal community for artists, travelers, and winter-time RV campers. Salvation Mountain is an outdoor art project at the western entrance to Slab City. Both attract tourists and sight-seers. Therefore, the project components would be readily visible to more people under Alternative 3 when compared to the proposed project. Compared to the proposed project, this alternative could result in greater aesthetics impacts.

Agricultural Resources

The Alternative 3 site is designated Other Land by the FMMP. Compared to the proposed project, implementation of this alternative would avoid the conversion of land designated as Prime Farmland (4.44 acres) and Farmland of Statewide Importance (204.95 acres). Therefore, this alternative would not contribute to the conversion of agricultural lands or otherwise adversely affect agricultural operations. This alternative would avoid any agricultural impacts associated with the proposed project.

Air Quality

This alternative is 61 acres larger than the proposed project site. Therefore, more solar panels could be installed on this site compared to the proposed project. Based on this consideration, this alternative would generate slightly increased air emissions compared to the proposed project. This alternative would result in greater air quality emissions compared to the proposed project.

Biological Resources

As discussed in Section 3.5, project implementation has the potential to impact special-status species, including burrowing owl. Compared to the proposed project, which is located within an active agricultural area, the Alternative 3 site is located on relatively undisturbed desert lands. The overall number of burrowing owl locations potentially impacted would be less because their potential to occur on the Alternative 3 site is lower than the proposed project site. Compared to the proposed project, development of this site would have less impacts on burrowing owl. However, this alternative has the potential to impact other sensitive plant and animal species associated with a relatively undisturbed desert setting.

The Alternative 3 site also contains desert washes and multiple braided channels. These features could be considered potentially jurisdictional waters. While the proposed project has been designed to avoid jurisdictional waters, Alternative 3 would require consultation with USACE and CDFW to avoid or minimize impacts upon federally and state jurisdictional drainage features. This alternative would result in greater impacts related to potential jurisdictional waters when compared to the proposed project.

Cultural Resources

This alternative would require the construction of supporting infrastructure (i.e., transmission towers, substation) that would require ground disturbance and therefore, has the potential to result in cultural

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resources impacts. While Alternative 3 may avoid the specific impacts on the proposed project site, this alternative would also require the construction of supporting infrastructure that has the potential to result in cultural resources impacts. Compared to the proposed project, although Alternative 3 would attempt to avoid cultural resources to the extent feasible, depending on the route of the proposed gen-tie line, this alternative could result in greater impacts on cultural resources because, while the proposed project site is located on active agricultural land, Alternative 3 is located on relatively undisturbed desert lands.

Geology and Soils

Grading and construction of new facilities, such as the solar facility and gen-tie line, would still occur under this alternative. Similar to the proposed project, this alternative would result in potentially significant impacts related to strong ground shaking, soil erosion, and paleontological resources and would require the incorporation of mitigation measures to minimize these impacts to a less than significant level. This alternative would result in similar geology and soil and paleontological resources impacts as the proposed project.

Greenhouse Gas Emissions

This alternative is 61 acres larger than the proposed project site. Therefore, more solar panels could be installed on this site compared to the proposed project. This alternative would result in a slightly higher power production capacity compared to the proposed project; hence, the overall benefits of the project to global climate change through the creation of renewable energy would be slightly greater. This alternative would not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases. Similar to the proposed project, this alternative would contribute desirable benefits to reductions in global climate change through the production of renewable energy.

Hazards and Hazardous Materials

Depending on the specific locations and conditions of the Alternative 3 project site that would need to be developed, certain hazards and hazardous materials may be encountered. The Alternative 3 project site may need to be remediated before implementation of the alternative. Overall, the degree of impact associated with hazards and hazardous materials would likely be similar to the proposed project.

Hydrology/Water Quality

A portion of the Alternative 3 site (Map Number 06025C0450C) contains an area mapped as Zone A. Alternative 3 could place structures (i.e., PV arrays, substation, or transmission towers) within a 100-year flood zone and result in the redirection of flood flows on the project site. The Alternative 3 site also contains desert washes and multiple braided channels. Implementation of this alternative could potentially result in the modification of the existing drainage patterns and the volume of storm water runoff on the project site. Compared to the proposed project, this alternative would result in greater impacts related to hydrology/water quality.

Land Use/Planning

The Alternative 3 project site is located within the RE Overlay Zone and would not require a General Plan Amendment or Zone Change to include/classify the project site into the RE Overlay Zone. Similar to the proposed project, Alternative 3 will require approval of a CUP to allow for the construction and

operation of a solar project. Similar to the proposed project, no Variance would be required under this alternative because the proposed height of the transmission towers (66 feet) would not exceed the 120 feet height limit of non-residential structures in the A-2-RE Zone. With approval of the CUP, the alternative would not conflict with the County's zoning ordinance. Therefore, land use and planning impacts are anticipated to be similar to the proposed project.

Public Services

Alternative 3 would require increased public services, specifically law enforcement and fire protection services. While the overall project footprint would be bigger (increased by approximately 61 acres), the impacts of this alternative to public services and associated service ratios would be similar. Like the proposed project, this alternative would be conditioned to provide law enforcement and fire service development impact fees. Therefore, this alternative would result in a similar impact related to public services as the proposed project.

Transportation

This alternative is 61 acres larger than the proposed project site. Therefore, more solar panels could be installed on this site compared to the proposed project. This alternative would result in a slightly increased level of construction and operation-related vehicle and truck trips as compared to the proposed project. However, the increase in vehicular traffic was identified as a less than significant impact for the proposed project. In this context, Alternative 3 would not reduce or avoid an impact related to transportation/traffic, and would result in less than significant impacts similar to the proposed project. As with the proposed project, this alternative would not impact any applicable plan, ordinance, or policy addressing the performance of the circulation system, substantially increase hazards because of a design feature, result in inadequate emergency access, or conflict with public transit, bicycle, or pedestrian facilities. This alternative would result in a similar impact related to transportation/traffic as the proposed project.

Tribal Cultural Resources

This alternative would require the construction of supporting infrastructure (i.e., transmission towers, substation) that would require ground disturbance and therefore, has the potential to result in tribal cultural resources impacts. Although this alternative would attempt to avoid impacts on tribal cultural resources to the extent feasible, depending on the route of the proposed gen-tie line, Alternative 3 could result in greater impacts to tribal cultural resources.

Utilities and Service Systems

This alternative is 61 acres larger than the proposed project site. Therefore, more solar panels could be installed on this site compared to the proposed project. Construction and operation of this alternative would result in slightly increased water demand (for dust control) and solid waste generation. Compared to the proposed project, this alternative would have greater water demands and associated impacts related to utilities and service systems.

Conclusion

As shown on Table 7-1, this alternative would avoid impacts on agricultural resources compared to the proposed project. This alternative would result in greater impacts for the following environmental

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issue areas as compared to the proposed project: aesthetics, air quality, biological resources, cultural resources, hydrology/water quality, tribal cultural resources, and utilities and service systems.

Comparison of Alternative 3: Development within Renewable Energy Overlay Zone – Desert Land to Project Objectives

Alternative 3 would meet most of the basic objectives of the proposed project and should remain under consideration. However, this alternative would result in greater impacts for the following environmental issue areas as compared to the proposed project: aesthetics, air quality, biological resources, cultural resources, hydrology/water quality, tribal cultural resources, and utilities and service systems. Further, the project applicant does not own, or otherwise control this property.

7.7 Alternative 4: Distributed Commercial and Industrial Rooftop Solar Only Alternative

This alternative would involve the development of a number of geographically distributed small to medium solar PV systems (100 kilowatts to 1 MW) within existing developed areas, typically on the rooftops of commercial and industrial facilities throughout Imperial County. Under this alternative, no new land would be developed or altered. Depending on the type of solar modules installed and the type of tracking equipment used, a similar or greater amount of acreage (i.e., greater than 200 acres of total rooftop area) may be required to attain the proposed project's capacity of 40 MW of solar PV generating capacity. This alternative would involve placement of PV structures, transmission lines, and development of additional supporting facilities, such as switching stations and substations at various locations throughout the County. This alternative assumes that rooftop development would occur primarily on commercial and industrial structures due to the greater availability of large, relatively flat roof areas necessary for efficient solar installations.

This alternative would require hundreds of installation locations across Imperial County, many of which would require approval of discretionary actions, such as design review, CUPs, or zone variances depending on local jurisdictional requirements. Similar to the proposed project, this alternative would be designed to operate year-round using PV panels to convert solar energy directly to electrical power. This alternative would involve the construction of transmission lines and development of additional supporting facilities, such as switching stations and substations at various locations throughout the County to distribute the energy.

Rooftop PV systems exist in small areas throughout California. Larger distributed solar PV installations are becoming more common. An example of a distributed PV system is 1 MW of distributed solar energy installed by Southern California Edison on a 458,000 square-foot industrial building in Chino, California.¹

Similar to utility-scale PV systems, the acreage of rooftops or other infrastructure required per MW of electricity produced is wide ranging, which is largely due to site-specific conditions (e.g., solar insolation levels, intervening landscape or topography, PV panel technology, etc.). Based on SCE's use of 458,000-square feet for 1 MW of energy, approximately 18,320,000 square feet (approximately 420 acres) would be required to produce 40 MW.

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http://newsroom.edison.com/releases/california-regulators-approve-southern-california-edison-proposal-to-create-nations-largest-solar-panel-installation-program

7.7.1 Environmental Impact of Alternative 4: Distributed Commercial and Industrial Rooftop Solar Only Alternative

Aesthetics

This alternative would reduce the overall size of the solar energy field located in one place. However, this alternative would involve placement of PV structures, transmission lines, and development of additional supporting facilities, such as switching stations and substations at various locations throughout the County. There could be significant aesthetic impacts in certain areas depending on the locations of these facilities. Transmission lines would need to be constructed to serve the PV generation sites, all of which would be placed in closer proximity to urban areas, and all of which would be more readily visible to more people as compared to the proposed project. Compared to the proposed project, this alternative could result in greater aesthetics impacts.

Agricultural Resources

Compared to the proposed project, this alternative would not include the conversion of Prime Farmland or Farmland of Statewide Importance for the solar generation facility. Therefore, this alternative would avoid the proposed project's impact to agricultural lands. Compared to the proposed project, this alternative would avoid the significant impacts associated with the agricultural issues.

Air Quality

Under this alternative, air emissions due to project construction could be less than the proposed project on a localized level; however, PV facilities and supporting infrastructure would still need to be constructed to support this alternative, which, like the proposed project, would involve short-term construction emissions. These emissions would likely be spread-out geographically throughout the basin, and would occur over a longer period of time, as this alternative would involve a longer overall timeframe for implementation. Furthermore, the construction efficiencies that can be obtained by mobilizing equipment and crews in one general location over a shorter timeframe would not be realized. By the nature of the alternative, in that solar panels would be constructed on habitable structures throughout the County, this alternative has the potential to expose more people to more localized construction-related emissions. Compared to the proposed project, this alternative would develop less renewable energy megawatt generation in the near-future, thereby reducing its ability to provide a long-term source of renewable energy and meeting renewable energy goals, and air quality impacts could be greater than those of the project under this alternative.

Biological Resources

Under this alternative, potential direct and indirect impacts to burrowing owl would be avoided as compared to the proposed project. However, this alternative would also require the construction of supporting infrastructure that has the potential to result in biological impacts. While this alternative may avoid the specific impacts associated with the proposed project, it could also result in greater biological impacts in other areas of the County where supporting infrastructure is required to support Distributed Energy facilities.

Cultural Resources

This alternative would require the construction of infrastructure that has the potential to result in cultural resources impacts. If rooftop solar panels were proposed on historic buildings, this alternative could

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affect the historic character and integrity of the buildings. Implementation of this alternative would require historic surveys and investigations to evaluate the eligibility of potentially historic structures that are over 50 years old, and either avoidance of such buildings, or incorporation of design measures to minimize impacts on historic integrity of historically-significant structures. Compared to the proposed project, this alternative could result in greater impacts related to cultural resources.

Geology and Soils

This alternative would involve placement of PV structures, transmission lines, and development of additional supporting facilities, such as switching stations and substations at various locations throughout the County. This alternative assumes that rooftop development would occur primarily on commercial and industrial structures due to the greater availability of large, relatively flat roof areas necessary for efficient solar installations. However, this alternative would still require grading and construction of new facilities such as transmission lines, PV structures, and supporting facilities (i.e., switching stations and substations) at various locations throughout the County. This alternative would likely result in similar impacts related to strong ground shaking, soil erosion, and paleontological resources as the proposed project. This alternative would also be subject to similar mitigation measures as the proposed project to minimize impacts to a less than significant level. This alternative would result in similar geological and soil impacts.

Greenhouse Gas Emissions

Under this alternative, the project footprint would be reduced; however, in order to achieve the same megawatt capacity as the proposed project, this alternative would also involve a surface area similar in size to the project site. Therefore, while this alternative could reduce or eliminate GHG emissions during project construction at the project site, an equivalent level of GHG emissions is likely to occur, as a result of constructing solar panels and supporting infrastructure throughout the County. Furthermore, as a consequence of the reduced PV footprint associated with the utility-scale solar farm, this alternative would result in a reduced power production capacity as compared to the proposed project; hence, the overall benefits of the project to global climate change through the creation of renewable energy would also be reduced. As with the proposed project, this alternative would not conflict with any applicable plan, policy, or regulation for the purpose of reducing the emissions of greenhouse gases. Compared to the proposed project, although this alternative would result in reduced construction emissions at the project site, overall, a similar level of emissions would be expected.

Hazards and Hazardous Materials

Hazards and hazardous materials-related impacts, including the potential for accidental discovery of undocumented hazardous materials during construction would be avoided. However, there are other hazards that could result from implementation of this alternative, depending on the specific locations and conditions of the various sites that would need to be developed. For example, electrical infrastructure would be placed on top of, or in closer proximity to habitable structures, such as office buildings. Electrical transmission systems would still be required in order to connect the various distributed energy systems to the electrical grid; therefore, there would be additional poles and other structures that could interfere with aviation, depending on their locations. Certain sites needed in order to implement this alternative may also contain hazardous materials that would need to be remediated before implementation of the alternative. Overall, the degree of impact associated with hazards and hazardous materials would likely be similar to the proposed project.

Hydrology/Water Quality

This alternative would likely avoid any impacts associated with modifications to the existing drainage patterns and the volume of storm water runoff, as this alternative would introduce less impervious surface areas (this alternative would involve construction of PV facilities on existing structures and within existing developed areas). Compared to the proposed project, this alternative would result in fewer impacts related to hydrology/water quality.

Land Use/Planning

Similar to the proposed project, this alternative would not divide an established community and would involve multiple planning approvals (e.g., variances, CUPs, rezones) in order to accommodate the solar generating uses within other zones of the County that currently do not allow such uses. With approval of planning approvals, land use and planning impacts resulting from this alternative would be similar to the proposed project.

Public Services

This alternative would require increased public services, specifically law enforcement and fire protection services. It is anticipated that public services and associated service ratios would, at a minimum, be similar to the proposed project as the facilities would require fire and law enforcement protection, and this alternative could result in a greater impact as the facilities would be distributed over a much larger geographical area. Similar to the proposed project, this alternative would be conditioned to provide law enforcement and fire service fees. This alternative would result in a similar impact related to public services.

Transportation

This alternative would not reduce or avoid an impact to transportation/traffic and would result in less than significant impacts similar to the proposed project. As with the proposed project, this alternative would not impact any applicable plan, ordinance, or policy addressing the performance of the circulation system, substantially increase hazards due to a design feature, result in inadequate emergency access, or conflict with public transit, bicycle, or pedestrian facilities. This alternative would result in a similar impact related to transportation/traffic as the proposed project.

Tribal Cultural Resources

This alternative would require the construction of supporting infrastructure that would require ground disturbance and therefore, has the potential to result in tribal cultural resources impacts. Although this alternative would attempt to avoid impacts on tribal cultural resources to the extent feasible, depending on the location of supporting infrastructure, Alternative 4 could result in greater impacts to tribal cultural resources.

Utilities and Service Systems

As with the proposed project, this alternative would require water service and energy for the operation of the project. This alternative would involve the construction of transmission lines and development of additional supporting facilities, such as switching stations and substations at various locations throughout the County to distribute the energy. Compared to the proposed project, this alternative could require the relocation or construction of new or expanded supporting energy infrastructure throughout the County. Compared to the proposed project, impacts associated with utilities and service

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systems resulting from this alternative could be potentially greater than those identified for the proposed project.

Conclusion

As shown on Table 7-1, implementation of Alternative 4: Distributed Commercial and Industrial Rooftop Solar Only Alternative would avoid impacts on agricultural resources compared to the proposed project. It would result in reduced impacts for the following environmental issue areas as compared to the proposed project: hydrology/water quality. Overall, this alternative would result in greater impacts related to aesthetics, air quality, biological resources, cultural resources, tribal cultural resources, and utilities and service systems.

Comparison of Alternative 4: Distributed Commercial and Industrial Rooftop Solar Only Alternative

Alternative 4: Distributed Commercial and Industrial Rooftop Solar Only Alternative would meet most of the basic objectives of the proposed project. However, this alternative would result in greater impacts for the following environmental issue areas as compared to the proposed project: aesthetics, air quality, biological resources, cultural resources, and utilities and service systems. Furthermore, this alternative would have a number of drawbacks, including, but not limited to the following:

- Difficulties with respect to buildout of the system within a timeframe that would be similar to that of the proposed project;
- Given the distributed nature of such a network of facilities, management and maintenance would not be as efficient, and total capital costs would likely be higher;
- The requirement to negotiate with a large number of individual property owners to permit placement of solar panels on rooftops;
- The difficulty of ensuring proper maintenance of a large number of smaller solar installations; and
- The lack of an effective electricity distribution system for large numbers of small electricity producers.

7.8 Environmentally Superior Alternative

Table 7-1 provides a qualitative comparison of the impacts for each alternative compared to the proposed project. As noted on Table 7-1, the No Project/No Development Alternative would be considered the environmentally superior alternative, since it would eliminate all of the significant impacts identified for the project. However, CEQA Guidelines Section 15126.6(e)(2) states that "if the environmentally superior alternative is the No Project Alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives." As shown on Table 7-1, Alternative 2 would be the environmental superior alternative because it would reduce impacts for the following environmental issue areas as compared to the proposed project: aesthetics and agricultural resources. Alternative 2 would meet most of the basic objectives of the proposed project. However, the project applicant does not own, or otherwise control this property.

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Table 7-1. Comparison of Alternative Impacts to Proposed Project

Environmental Issue Area	Proposed Project	Alternative 1: No Project/No Development	Alternative 2: Development within Renewable Energy Overlay Zone – Agricultural Lands	Alternative 3: Development within Renewable Energy Overlay Zone – Desert Lands	Alternative 4: Distributed Commercial and Industrial Rooftop Solar Only Alternative
Aesthetics	Less than Significant	CEQA Significance:	CEQA Significance:	CEQA Significance:	CEQA Significance:
	9	No Impact	Potentially Significant	Potentially Significant	Potentially Significant
		Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:
		Less Impact	Less Impact	Greater Impact	Greater Impact
Agricultural	Less than	CEQA Significance:	CEQA Significance:	CEQA Significance:	CEQA Significance:
Resources	Significant with Mitigation	No Impact	Less than Significant with Mitigation Comparison to Proposed	No Impact	No Impact
·····gaus		Comparison to Proposed Project:		Comparison to Proposed Project:	Comparison to Proposed Project:
		Avoid	Project: Less Impact	Avoid	Avoid
Air Quality Less than Significant		CEQA Significance:	CEQA Significance:	CEQA Significance:	CEQA Significance:
		No Impact	Less than Significant	Potentially Significant	Potentially Significant
		Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:
		Less Impact	Similar	Greater Impact	Greater Impact
Biological Resources	Less than Significant with Mitigation	CEQA Significance:	CEQA Significance:	CEQA Significance:	CEQA Significance:
			No Impact	Less than Significant with Mitigation	Less than Significant with Mitigation
		Comparison to Proposed	Comparison to Proposed	Comparison to Proposed	Project:
		Project: Less Impact (Avoid)	Project: Similar Impact	Project: Greater Impact	Greater Impact

Table 7-1. Comparison of Alternative Impacts to Proposed Project

Environmental Issue Area	Proposed Project	Alternative 1: No Project/No Development	Alternative 2: Development within Renewable Energy Overlay Zone – Agricultural Lands	Alternative 3: Development within Renewable Energy Overlay Zone – Desert Lands	Alternative 4: Distributed Commercial and Industrial Rooftop Solar Only Alternative
Cultural Resources	Less than	CEQA Significance:	CEQA Significance:	CEQA Significance:	CEQA Significance:
	Significant with Mitigation	No Impact	Potentially Significant	Potentially Significant	Potentially Significant
	, c	Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:
		Less Impact (Avoid)	Greater Impact	Greater Impact	Greater Impact
Geology and Soils	Less than	CEQA Significance:	CEQA Significance:	CEQA Significance:	CEQA Significance:
	Significant with Mitigation	No Impact	Less than Significant with Mitigation	Less than Significant with Mitigation	Less than Significant with Mitigation
		Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:
		Less Impact (Avoid)	Similar Impact	Similar Impact	Similar Impact
GHG Emissions	Less than Significant	CEQA Significance:	CEQA Significance:	CEQA Significance:	CEQA Significance:
Significar		No Impact	Less than Significant	Less than Significant	Less than Significant
		Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:
		Less Impact	Similar Impact	Similar Impact	Similar Impact
Hazards and	Less than	CEQA Significance:	CEQA Significance:	CEQA Significance:	CEQA Significance:
Hazardous Materials	Significant	No Impact	Less than Significant	Less than Significant	Less than Significant
		Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:
		Less Impact	Similar Impact	Similar Impact	Similar Impact

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Table 7-1. Comparison of Alternative Impacts to Proposed Project

Environmental Issue Area	Proposed Project	Alternative 1: No Project/No Development	Alternative 2: Development within Renewable Energy Overlay Zone – Agricultural Lands	Alternative 3: Development within Renewable Energy Overlay Zone – Desert Lands	Alternative 4: Distributed Commercial and Industrial Rooftop Solar Only Alternative
Hydrology/ Water	Less than	CEQA Significance:	CEQA Significance:	CEQA Significance:	CEQA Significance:
Quality	Significant with Mitigation	No Impact	Less than Significant with Mitigation	Potentially Significant	Less than Significant with Mitigation
		Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:
		Less Impact (Avoid)	Greater Impact	Greater Impact	Less Impact
Land Use/Planning	Less than Significant	CEQA Significance:	CEQA Significance:	CEQA Significance:	CEQA Significance:
		No Impact	Less than Significant	Less than Significant	Less than Significant
		Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:
		Similar Impact	Similar Impact	Similar Impact	Similar Impact
	Less than Significant	CEQA Significance:	CEQA Significance:	CEQA Significance:	CEQA Significance:
		No Impact	Less than Significant	Less than Significant	Less than Significant
		Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:
		Less Impact	Similar Impact	Similar Impact	Similar Impact
Transportation	Less than Significant	CEQA Significance:	CEQA Significance:	CEQA Significance:	CEQA Significance:
		No Impact	Less than Significant	Less than Significant	Less than Significant
		Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:
		Less Impact	Similar Impact	Similar Impact	Similar Impact

Table 7-1. Comparison of Alternative Impacts to Proposed Project

Environmental Issue Area	Proposed Project	Alternative 1: No Project/No Development	Alternative 2: Development within Renewable Energy Overlay Zone – Agricultural Lands	Alternative 3: Development within Renewable Energy Overlay Zone – Desert Lands	Alternative 4: Distributed Commercial and Industrial Rooftop Solar Only Alternative
Tribal Cultural	Less than	CEQA Significance:	CEQA Significance:	CEQA Significance:	CEQA Significance:
Resources	Resources Significant	No Impact	Potentially Significant	Potentially Significant	Potentially Significant
		Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:
		Similar Impact	Greater Impact	Greater Impact	Greater Impact
	Less than	CEQA Significance:	CEQA Significance:	CEQA Significance:	CEQA Significance:
	Significant	No Impact	Less than Significant	Less than Significant	Less than Significant
		Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:	Comparison to Proposed Project:
		Less Impact	Similar Impact	Greater Impact	Greater Impact

Notes:

CEQA=California Environmental Quality Act; GHG=greenhouse gas

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9 EIR Preparers and Persons and Organizations Contacted

9.1 EIR Preparers

This EIR was prepared for the County of Imperial by HDR at 591 Camino de la Reina, Suite 300, San Diego, CA 92108. The following professionals participated in its preparation:

County of Imperial

Jim Minnick, Planning & Development Services Director

Michael Abraham, AICP, Assistant Planning & Development Services Director

David Black, Planner IV

HDR

Tim Gnibus, Principal

Sharyn Del Rosario, Project Manager

Elaine Lee, Environmental Planner

Terrileigh Pellarin, Environmental Planner

Jade Dean, Geographic Information Systems Analyst

Katie Turner, Document Production Administrator

HDR was assisted by the following consultants:

Chambers Group, Inc. (Visual Impact Assessment, Biological Technical Report, Archaeological and Paleontological Assessment Report)

9620 Chesapeake Drive, Suite 202

San Diego, CA 92123

Dubose Design Group (Water Supply Assessment)

1065 W State Street

El Centro, CA 92243

Linscott, Law & Greenspan, Engineers (Traffic Letter Report)

4542 Ruffner Street, Suite 100

San Diego, CA 92111

Petra Geotechnical, Inc. (Geotechnical Feasibility Study)

38655 Sky Canyon Drive, Suite A

Murrieta, CA 92563

Power Engineers, Inc. (Glare Analysis)

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2041 South Cobalt Point Way

Meridian, ID 83642

Vista Environmental (Air Quality, Energy, and Greenhouse Gas Emissions Impact Analysis, Noise Impact Analysis)

1021 Didrickson Way

Laguna Beach, CA 92651

9.2 Persons and Organizations Contacted

The following persons and organizations were contacted in preparation of this document:

- Imperial Irrigation District
- City of Brawley, Public Works Department

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Appendix A

Initial Study and Notice of Preparation and Responses

Notice of Preparation

-	Office of Planning & Research (Agency)				
	P.O. Box 3044, 1400 Tenth Street, Room 212				
-	(Address)				

Subject: Notice of Preparation of a Draft Environmental Impact Report

Lead Agency:		Consulting Firm (If applicable):			
Agency Name	Imperial County, Planning & Dev Svcs.	Firm Name	HDR		
Street Address	801 Main Street	Street Address	591 Camino de la Reina, Suite 300		
City/State/Zip	El Centro, CA 92243	City/State/Zip	San Diego, CA 92108		
Contact	David Black	Contact	Tim Gnibus		

The County of Imperial will be the Lead Agency and will prepare an Environmental Impact Report (EIR) for the project identified below. We need to know the views of your agency as to the scope and content of the Environmental Information, which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR prepared by our agency when considering your permit or other approval for the project.

The project description, location, and the potential environmental effects are contained in the attached materials. A copy of the Initial Study is attached.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but *not later* than 35 days after receipt of this notice.

Please send your response to <u>Imperial County Planning & Development Services</u>, <u>Attn: David Black</u> at the address shown above. We will need the name for a contact person in your agency.

Project Title: Brawley Solar Energy Facility Project

Project Location: The project site is located on approximately 227 acres of privately-owned land (Assessor Parcel Nos. [APN] 037-140-006, -020, -021, -022, and -023) in the unincorporated area of Imperial County, CA. The site is approximately one mile north from the City of Brawley's jurisdictional limit. The project site is south of Baughman Road, west of Best Road, and north of Andre Road. The Union Pacific Railway transects the project site. The City of Brawley Wastewater Treatment Plant is located along the western edge of the project site.

The gen-tie line would originate from the southern edge of the project site and then head west along Andre Road to interconnect to the Imperial Irrigation District's (IID) existing North Brawley Geothermal Power Plant substation, located at Hovley Road and Andre Road. The gen-tie line route would be approximately 1.8 miles.

Project Description (brief): The project applicant, ORNI 30, LLC, proposes to construct and operate a 40 megawatt (MW) photovoltaic (PV) solar facility with an integrated 40 MW battery energy storage system (BESS) (not to exceed 80 MW) on approximately 227 acres of privately-owned land. The proposed project would be comprised of bifacial solar PV arrays panels, an on-site substation, BESS, fiberoptic line or microwave tower, inverters, transformers, underground electrical cables and access roads. The proposed project would connect to the existing North Brawley Geothermal Power Plant substation located southwest of the project site via an approximately 1.8-mile long aboveground 92 kilovolt generation tie line.

Project Applicant: ORNI 30, LLC

The County Land Use Ordinance, Division 17, includes the Renewable Energy (RE) Overlay Zone, which authorizes the development and operation of renewable energy projects with an approved conditional use permit (CUP). CUP applications proposed for specific renewable energy projects not located in the RE Overlay Zone would not be allowed without an amendment to the RE Overlay Zone. As shown in Figure 1, the northern portion of the project site (APNs 037-140-020 and 037-140-021) is located within the Geothermal Overlay Zone. However, the entire project site (APNs 037-140-020, 037-140-021, 037-140-022, 037-140-023, and 037-140-006) is located outside of the RE Overlay Zone.

Implementation of the project requires an amendment to the County's General Plan Renewable Energy and Transmission Element, Zone Change, and approval of a CUP, as described below:

- General Plan Amendment: The applicant is requesting a General Plan Amendment to include/classify all five project parcels (Assessor Parcel Nos. [APN] 037-140-006, -020, -021, -022, and -023) into the RE Overlay Zone. No change in the underlying General Plan land use (Agriculture) is proposed.
- **Zone Change:** The entire project site is currently zoned General Agricultural with a Geothermal Overlay (A-2-G). The applicant is requesting a Zone Change to include/classify all five project parcels into the Renewable Energy/Geothermal (REG) Overlay Zone (A-2-REG).
- Conditional Use Permit: Implementation of the project would require the approval of a CUP by the County to allow for the construction and operation of the proposed solar energy facility with an integrated BESS on land zoned General Agricultural with a REG Overlay Zone (A-2-REG).
- Water Supply Assessment: Implementation of the project would require the approval of the Water Supply Assessment.

Date	7/2	1/21	Signature	till Wa
			Title	
			Telephone	

Reference: California Administrative Code, Title 14, (CEQA Guidelines) Section 15082(a), 15103, 15375.





Appendix J

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Imperial County Planning & Development Services Department

NOTICE OF PREPARATION OF DRAFT EIR FOR BRAWLEY SOLAR ENERGY FACILITY PROJECT AND NOTICE OF PUBLIC EIR SCOPING MEETING

The Imperial County Planning & Development Services Department intends to prepare an Environmental Impact Report (EIR) for the proposed Brawley Solar Energy Facility Project as described below. A public scoping meeting for the proposed EIR will be held by the Imperial County Planning & Development Services Department on **August 12**, **2021 at 6:00 P.M**. The scoping meeting will be held at the Planning & Development Services, Conference room located at 901 Main Street, El Centro, CA 92243. Comments regarding the scope of the EIR will be accepted at this meeting.

SUBJECT: Brawley Solar Energy Facility Project EIR

BOARD OF SUPERVISORS CONSIDERATION: To Be Determined.

PROJECT LOCATION: The project site is located on approximately 227 acres of privately-owned land (Assessor Parcel Nos. [APN] 037-140-006, -020, -021, -022, and -023) in the unincorporated area of Imperial County, CA. The site is approximately one mile north from the City of Brawley's jurisdictional limit. The project site is south of Baughman Road, west of Best Road, and north of Andre Road. The Union Pacific Railway transects the project site. The City of Brawley Wastewater Treatment Plant is located along the western edge of the project site.

The gen-tie line would originate from the southern edge of the project site and then head west along Andre Road to interconnect to the Imperial Irrigation District's (IID) existing North Brawley Geothermal Power Plant substation, located at Hovley Road and Andre Road. The gen-tie line route would be approximately 1.8 miles.

PROJECT DESCRIPTION: The project applicant, ORNI 30, LLC, proposes to construct and operate a 40 megawatt (MW) photovoltaic (PV) solar facility with an integrated 40 MW battery energy storage system (BESS) (not to exceed 80 MW) on approximately 227 acres of privately-owned land. The proposed project would be comprised of bifacial solar PV arrays panels, an on-site substation, BESS, fiberoptic line or microwave tower, inverters, transformers, underground electrical cables and access roads. The proposed project would connect to the existing North Brawley Geothermal Power Plant substation located southwest of the project site via an approximately 1.8-mile long aboveground 92 kilovolt generation tie line.

The County Land Use Ordinance, Division 17, includes the Renewable Energy (RE) Overlay Zone, which authorizes the development and operation of renewable energy projects with an approved conditional use permit (CUP). CUP applications proposed for specific renewable energy projects not located in the RE Overlay Zone would not be allowed without an amendment to the RE Overlay Zone. The northern portion of the project site (APNs 037-140-020 and 037-140-021) is located within the Geothermal Overlay Zone. However, the entire project site (APNs 037-140-020, 037-140-021, 037-140-022, 037-140-023, and 037-140-006) is located outside of the RE Overlay Zone.

Implementation of the project requires an amendment to the County's General Plan Renewable Energy and Transmission Element, Zone Change, and approval of a CUP, as described below:

- **General Plan Amendment:** The applicant is requesting a General Plan Amendment to include/classify all five project parcels (Assessor Parcel Nos. [APN] 037-140-006, -020, -021, -022, and -023) into the RE Overlay Zone. No change in the underlying General Plan land use (Agriculture) is proposed.
- **Zone Change:** The entire project site is currently zoned General Agricultural with a Geothermal Overlay (A-2-G). The applicant is requesting a Zone Change to include/classify all five project parcels into the Renewable Energy/Geothermal (REG) Overlay Zone (A-2-REG).
- Conditional Use Permit: Implementation of the project would require the approval of a CUP by the County to allow for the construction and operation of the proposed solar energy facility with an integrated BESS on land zoned General Agricultural with a REG Overlay Zone (A-2-REG).
- Water Supply Assessment: Implementation of the project would require the approval of the Water Supply Assessment.

PROJECT APPLICANT: ORNI 30, LLC

URBAN AREA PLAN: None, located in unincorporated area of County of Imperial

BOARD OF SUPERVISORS DISTRICT: District 4, Supervisor Ryan E. Kelley

ANTICIPATED SIGNIFICANT EFFECTS: The EIR will analyze potential impacts associated with the following: Aesthetics; Agricultural Resources; Air Quality; Biological Resources; Cultural Resources; Geology/Soils; Greenhouse Gas Emissions/Climate Change; Hazards and Hazardous Materials; Hydrology/Water Quality; Land Use/Planning; Public Services; Transportation; Tribal Cultural Resources; Utilities and Service Systems including water supply; Cumulative Impacts; and, Growth-Inducing Impacts.

COMMENTS REQUESTED: The Imperial County Planning & Development Services Department would like to know your ideas about the potential effects this project might have on the environment and your suggestions as to mitigation or ways the project may be revised to reduce or avoid any potentially significant environmental impacts. Your comments will guide the scope and content of potential environmental issues to be examined in the EIR. Your comments may be submitted in writing to David Black, Imperial County Planning & Development Services Department, 801 Main Street, El Centro, CA 92243. Available project information may be reviewed at this location.

NOTICE OF PREPARATION REVIEW PERIOD: July 26, 2021 through August 30, 2021

Imperial County Planning & Development Services Department

NOTICE OF PREPARATION OF DRAFT EIR FOR BRAWLEY SOLAR ENERGY FACILITY PROJECT AND NOTICE OF PUBLIC EIR SCOPING MEETING

The Imperial County Planning & Development Services Department intends to prepare an Environmental Impact Report (EIR) for the proposed Brawley Solar Energy Facility Project as described below. A public scoping meeting for the proposed EIR will be held by the Imperial County Planning & Development Services Department on August 12, 2021 at 6:00 P.M. The scoping meeting will be held at the Planning & Development Services, Conference room located at 901 Main Street, El Centro, CA 92243. Comments regarding the scope of the EIR will be accepted at this meeting.

SUBJECT: Brawley Solar Energy Facility Project EIR

BOARD OF SUPERVISORS CONSIDERATION: To Be Determined.

PROJECT LOCATION: The project site is located on approximately 227 acres of privately-owned land (Assessor Parcel Nos. [APN] 037-140-006, -020, -021, -022, and -023) in the unincorporated area of Imperial County, CA. The site is approximately one mile north from the City of Brawley's jurisdictional limit. The project site is south of Baughman Road, west of Best Road, and north of Andre Road. The Union Pacific Railway transects the project site. The City of Brawley Wastewater Treatment Plant is located along the western edge of the project site.

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The County Land Use Ordinance, Division 17, includes the Renewable Energy (RE) Overlay Zone, which authorizes the development and operation of renewable energy projects with an approved conditional use permit (CUP). CUP applications proposed for specific renewable energy projects not located in the RE Overlay Zone would not be allowed without an amendment to the RE Overlay Zone. The northern portion of the project site (APNs 037-140-020 and 037-140-021) is located within the Geothermal Overlay Zone. However, the entire project site (APNs 037-140-020, 037-140-021, 037-140-022, 037-140-023, and 037-140-006) is located outside of the RE Overlay Zone.

Implementation of the project requires an amendment to the County's General Plan Renewable Energy and Transmission Element, Zone Change, and approval of a CUP, as described below:

- General Plan Amendment: The applicant is requesting a General Plan Amendment to include/ classify all five project parcels (Assessor Parcel Nos. [APN] 037-140-006, -020, -021, -022, and -023) into the RE Overlay Zone. No change in the underlying General Plan land use (Agriculture) is proposed.
- Zone Change: The entire project site is currently zoned General Agricultural with a Geothermal Overlay (A-2-G). The applicant is requesting a Zone Change to include/classify all five project parcels into the Renewable Energy/Geothermal (REG) Overlay Zone (A-2-REG).
- Conditional Use Permit: Implementation of the project would require the approval of a CUP by the County to allow for the construction and operation of the proposed solar energy facility with an integrated BESS on land zoned General Agricultural with a REG Overlay Zone (A-2-REG).
- Water Supply Assessment: Implementation of the project would require the approval of the Water Supply Assessment.

PROJECT APPLICANT: ORNI 30, LLC

URBAN AREA PLAN: None, located in unincorporated area of County of Imperial

BOARD OF SUPERVISORS DISTRICT: District 4, Supervisor Ryan E. Kelley

ANTICIPATED SIGNIFICANT EFFECTS: The EIR will analyze potential impacts associated with the following: Aesthetics; Agricultural Resources; Air Quality; Biological Resources; Cultural Resources; Geology/Soils; Greenhouse Gas Emissions/Climate Change; Hazards and Hazardous Materials; Hydrology/Water Quality; Land Use/Planning; Public Services; Transportation; Tribal Cultural Resources; Utilities and Service Systems including water supply; Cumulative Impacts; and, Growth-Inducing Impacts.

COMMENTS REQUESTED: The Imperial County Planning & Development Services Department would like to know your ideas about the potential effects this project might have on the environment and your suggestions as to mitigation or ways the project may be revised to reduce or avoid any potentially significant environmental impacts. Your comments will guide the scope and content of potential environmental issues to be examined in the EIR. Your comments may be submitted in writing to David Black, Imperial County Planning & Development Services Department, 801 Main Street, El Centro, CA 92243. Available project information may be reviewed at this location.

NOTICE OF PREPARATION REVIEW PERIOD: July 26, 2021 through August 30, 2021

Imperial Valley Press ■ Sunday, July 25, 2021 ■

Initial Study

FDS



Initial Study and NOP

Brawley Solar Energy Facility Project

Imperial County, CA

July 2021

Reviewed by:

County of Imperial

Planning & Development Services Department

801 Main Street

El Centro, CA 92243

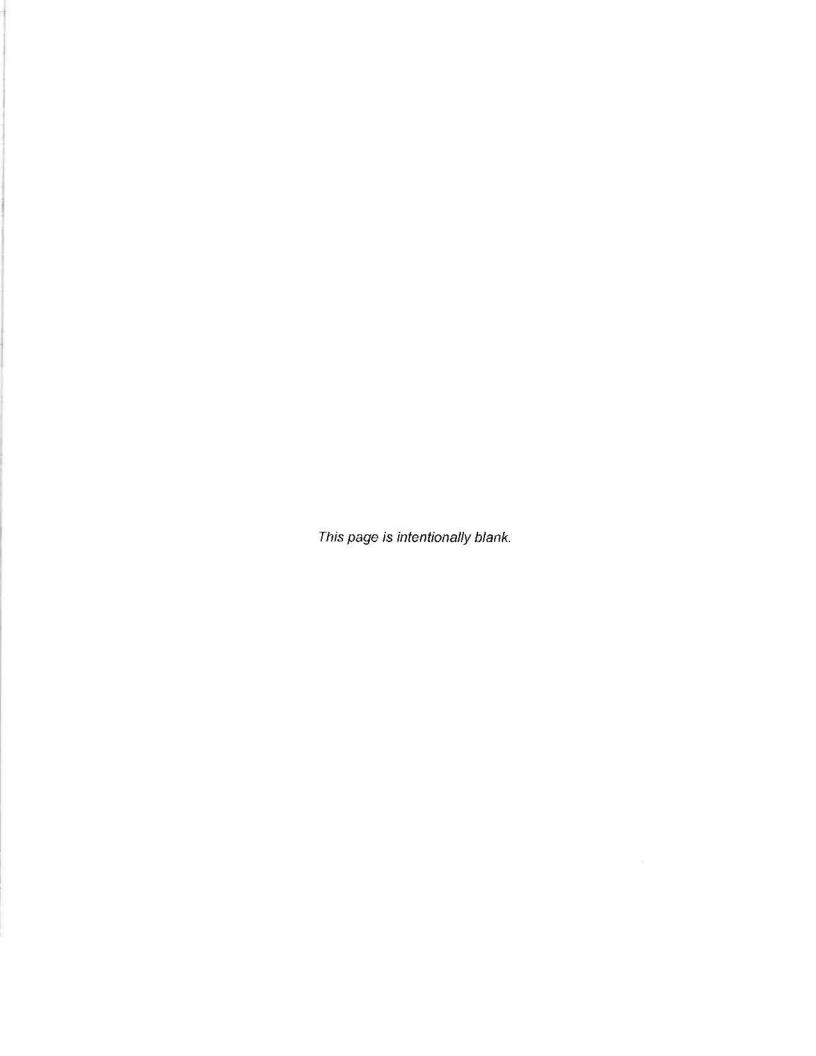
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Introduction

A. Purpose

This document is a □ policy-level; ⊠ project-level Initial Study for evaluation of potential environmental impacts resulting with the proposed Brawley Solar Energy Facility Project.

B. CEQA Requirements and the Imperial County's Rules and Regulations for Implementing CEQA

As defined by Section 15063 of the State California Environmental Quality Act (CEQA) Guidelines and Section 7 of the County's Rules and Regulations for Implementing CEQA, an **Initial Study** is prepared primarily to provide the Lead Agency with information to use as the basis for determining whether an Environmental Impact Report (EIR), Negative Declaration, or Mitigated Negative Declaration would be appropriate for providing the necessary environmental documentation and clearance for any proposed project.

- According to Section 15065, an **EIR** is deemed appropriate for a particular proposal if the following conditions occur:
 - The proposal has the potential to substantially degrade quality of the environment.
 - The proposal has the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals.
 - The proposal has possible environmental effects that are individually limited but cumulatively considerable.
 - The proposal could cause direct or indirect adverse effects on human beings.
- ☐ According to Section 15070(a), a **Negative Declaration** is deemed appropriate if the proposal would not result in any significant effect on the environment.
- □ According to Section 15070(b), a Mitigated Negative Declaration is deemed appropriate if it is determined that though a proposal could result in a significant effect, mitigation measures are available to reduce these significant effects to insignificant levels.

This Initial Study has determined that the proposed applications will result in potentially significant environmental impacts and therefore, an Environmental Impact Report is deemed as the appropriate document to provide necessary environmental evaluations and clearance for the proposed project.

This Initial Study and Notice of Preparation are prepared in conformance with the California Environmental Quality Act of 1970, as amended (Public Resources Code, Section 21000 et. seq.); the State CEQA Guidelines & County of Imperial's CEQA Regulations, Guidelines for the Implementation of CEQA; applicable requirements of the County of Imperial; and the regulations, requirements, and procedures of any other responsible public agency or an agency with jurisdiction by law.

Pursuant to the County of Imperial's <u>CEQA Regulations</u>, <u>Guidelines for the Implementation of CEQA</u>, depending on the project scope, the County of Imperial Board of Supervisors, Planning

Commission and/or Planning Director is designated the Lead Agency, in accordance with Section 15050 of the CEQA Guidelines. The Lead Agency is the public agency which has the principal responsibility for approving the necessary environmental clearances and analyses for any project in the County.

C. Intended Uses of Initial Study and Notice of Preparation

This Initial Study and Notice of Preparation are informational documents which are intended to inform County of Imperial decision makers, other responsible or interested agencies, and the general public of potential environmental effects of the proposed applications. The environmental review process has been established to enable public agencies to evaluate environmental consequences and to examine and implement methods of eliminating or reducing any potentially adverse impacts. While CEQA requires that consideration be given to avoiding environmental damage, the Lead Agency and other responsible public agencies must balance adverse environmental effects against other public objectives, including economic and social goals.

The Initial Study and Notice of Preparation, prepared for the project will be circulated for a period of no less than 35 days for public and agency review and comments.

D. Contents of Initial Study and Notice of Preparation

This Initial Study is organized to facilitate a basic understanding of the existing setting and environmental implications of the proposed applications.

SECTION 1

I. INTRODUCTION presents an introduction to the entire report. This section discusses the environmental process, scope of environmental review, and incorporation by reference documents.

SECTION 2

II. ENVIRONMENTAL CHECKLIST FORM contains the County's Environmental Checklist Form. The checklist form presents results of the environmental evaluation for the proposed applications and those issue areas that would have either a significant impact, potentially significant impact, or no impact.

PROJECT SUMMARY, LOCATION AND ENVIRONMENTAL SETTINGS describes the proposed project entitlements and required applications. A description of discretionary approvals and permits required for project implementation is also included. It also identifies the location of the project and a general description of the surrounding environmental settings.

ENVIRONMENTAL ANALYSIS evaluates each response provided in the environmental checklist form. Each response checked in the checklist form is discussed and supported with sufficient data and analysis as necessary. As appropriate, each response discussion describes and identifies specific impacts anticipated with project implementation.

SECTION 3

III. MANDATORY FINDINGS presents Mandatory Findings of Significance in accordance with Section 15065 of the CEQA Guidelines.

E. Scope of Environmental Analysis

For evaluation of environmental impacts, each question from the Environmental Checklist Form is summarized and responses are provided according to the analysis undertaken as part of the Initial Study. Impacts and effects will be evaluated and quantified, when appropriate. To each question, there are four possible responses, including:

- 1. No Impact: A "No Impact" response is adequately supported if the impact simply does not apply to the proposed applications.
- Less Than Significant Impact: The proposed applications will have the potential to impact the environment. These impacts, however, will be less than significant; no additional analysis is required.
- Less Than Significant With Mitigation Incorporated: This applies where incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact."
- 4. Potentially Significant Impact: The proposed applications could have impacts that are considered significant. Additional analyses and possibly an EIR could be required to identify mitigation measures that could reduce these impacts to less than significant levels.

F. Policy-Level or Project-Level Environmental Analysis

This Initial Study will be conducted under a □ policy-level, ⊠project-level analysis.

Regarding mitigation measures, it is not the intent of this document to "overlap" or restate conditions of approval that are commonly established for future known projects or the proposed applications. Additionally, those other standard requirements and regulations that any development must comply with, that are outside the County's jurisdiction, are also not considered mitigation measures, and therefore, will not be identified in this document.

G. Tiered Documents and Incorporation by Reference

Information, findings, and conclusions contained in this document are based on incorporation by reference of tiered documentation, which are discussed in the following section.

1. Tiered Documents

As permitted in Section 15152(a) of the CEQA Guidelines, information and discussions from other documents can be included into this document. Tiering is defined as follows:

"Tiering refers to using the analysis of general matters contained in a broader EIR (such as the one prepared for a general plan or policy statement) with later EIRs and negative declarations on narrower projects; incorporating by reference the general discussions from the broader EIR; and concentrating the later EIR or negative declaration solely on the issues specific to the later project."

Tiering also allows this document to comply with Section 15152(b) of the CEQA Guidelines, which discourages redundant analyses, as follows:

"Agencies are encouraged to tier the environmental analyses which they prepare for separate but related projects including the general plans, zoning changes, and development

projects. This approach can eliminate repetitive discussion of the same issues and focus the later EIR or negative declaration on the actual issues ripe for decision at each level of environmental review. Tiering is appropriate when the sequence of analysis is from an EIR prepared for a general plan, policy or program to an EIR or negative declaration for another plan, policy, or program of lesser scope, or to a site-specific EIR or negative declaration."

Further, Section 15152(d) of the CEQA Guidelines states:

"Where an EIR has been prepared and certified for a program, plan, policy, or ordinance consistent with the requirements of this section, any lead agency for a later project pursuant to or consistent with the program, plan, policy, or ordinance should limit the EIR or negative declaration on the later project to effects which:

- (1) Were not examined as significant effects on the environment in the prior EIR; or
- (2) Are susceptible to substantial reduction or avoidance by the choice of specific revisions in the project, by the imposition of conditions, or other means."

2. Incorporation by Reference

Incorporation by reference is a procedure for reducing the size of EIRs/MND and is most appropriate for including long, descriptive, or technical materials that provide general background information, but do not contribute directly to the specific analysis of the project itself. This procedure is particularly useful when an EIR or Negative Declaration relies on a broadly-drafted EIR for its evaluation of cumulative impacts of related projects (*Las Virgenes Homeowners Federation v. County of Los Angeles* [1986, 177 Ca.3d 300]). If an EIR or Negative Declaration relies on information from a supporting study that is available to the public, the EIR or Negative Declaration cannot be deemed unsupported by evidence or analysis (*San Francisco Ecology Center v. City and County of San Francisco* [1975, 48 Ca.3d 584, 595]).

When an EIR or Negative Declaration incorporates a document by reference, the incorporation must comply with Section 15150 of the CEQA Guidelines as follows:

- The incorporated document must be available to the public or be a matter of public record (CEQA Guidelines Section 15150[a]). The General Plan EIR is available, along with this document, at the County of Imperial Planning & Development Services Department, 801 Main Street, El Centro, CA 92243 Ph. (442) 265-1736.
- This document must be available for inspection by the public at an office of the lead agency (CEQA Guidelines Section 15150[b]). These documents are available at the County of Imperial Planning & Development Services Department, 801 Main Street, El Centro, CA 92243, Ph. (442) 265-1736.
- These documents must summarize the portion of the document being incorporated by reference or briefly describe information that cannot be summarized. Furthermore, these documents must describe the relationship between the incorporated information and the analysis in the tiered documents (CEQA Guidelines Section 15150[c]). As discussed above, the tiered EIRs address the entire project site and provide background and inventory information and data which apply to the project site. Incorporated information and/or data will be cited in the appropriate sections.

 These documents must include the State identification number of the incorporated documents (CEQA Guidelines Section 15150[d]). The State Clearinghouse Number for the 'County of Imperial General Plan EIR is SCH #93011023.

The material to be incorporated in this document will include general background information (CEQA Guidelines Section 15150[f]).

Environmental Checklist Form

- 1. Project Title: Brawley Solar Energy Facility Project
- Lead Agency name and address: Imperial County Planning & Development Services
 Department, 801 Main Street, El Centro, CA 92243
- 3. Contact person and phone number: David Black, Planner IV, 442-265-1746
- 4. Project location: The project site is located on approximately 227 acres of privately-owned land in the unincorporated area of Imperial County, CA. The site is approximately one mile north from the City of Brawley's jurisdictional limit. The project site is south of Baughman Road, west of Best Road, and north of Andre Road. The Union Pacific Railway transects the project site. The City of Brawley Wastewater Treatment Plant is located along the western edge of the project site.

The gen-tie line would originate from the southern edge of the project site and then head west along Andre Road to interconnect to the Imperial Irrigation District's (IID) existing North Brawley Geothermal Power Plant substation, located at Hovley Road and Andre Road. The gen-tie line route would be approximately 1.8 miles.

- Project sponsor's name and address: ORNI 30, LLC, 6140 Plumas Street, Reno, Nevada 89519
- 6. General Plan Designation: Agriculture
- 7. **Zoning**: A-2-G (General Agricultural with a Geothermal Overlay)
- 8. Description of project: The project applicant, ORNI 30, LLC, proposes to construct and operate a 40 megawatt (MW) photovoltaic (PV) solar facility with an integrated 40 MW battery storage system (BESS) (not to exceed 80 MW) on approximately 227 acres of privately-owned land. The proposed project would be comprised of bifacial solar PV arrays panels, an on-site substation, BESS, fiberoptic line or microwave tower, inverters, transformers, underground electrical cables and access roads. The proposed project would connect to the existing North Brawley Geothermal Power Plant substation located southwest of the project site via an approximately 1.8-mile long aboveground 92 kilovolt generation tie line.
- 9. Surrounding land uses and setting: Briefly describe the project's surroundings: The project site contains alfalfa fields within different levels of harvest. North and east of the project site is undeveloped agricultural land. South of the project site is a mixture of undeveloped agricultural land and dirt lots used for staging activities. The Del Rio Country Club golf course is located to the south of the site. The City of Brawley Wastewater Treatment Plant is located along the western edge of the project site.
- 10. Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement.):
 - Department of Public Works Ministerial permits (building, grading, encroachment)
 - Imperial County Air Pollution Control District Fugitive dust control plan, Authority to construct

- California Regional Water Quality Control Board Notice of Intent for General Construction Permit
- Imperial Irrigation District Water supply agreement/permit for water use lease agreement
- 11. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?

Yes, the Torrez Martinez Desert Cahuilla Indians and Quechan Indian Tribe. These tribes were sent an AB 52 consultation request letter on July 20, 2021.

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 Impact" as indicated by the checklist on the following pages.

\boxtimes	Aesthetics		Agriculture and Forestry Resources		Air Quality		
\boxtimes	Biological Resources	\boxtimes	Cultural Resources		Energy		
\boxtimes	Geology/Soils	\boxtimes	Greenhouse Gas Emissions	\boxtimes	Hazards & Hazardous Materials		
	Hydrology / Water Quality	\boxtimes	Land Use/Planning		Mineral Resources		
	Noise		Population/Housing	\boxtimes	Public Services		
	Recreation	\boxtimes	Transportation	\boxtimes	Tribal Cultural Resources		
	Utilities/Service Systems		Wildfire	\boxtimes	Mandatory Findings of Significance		
After	Review of the Initial Stud	y, the	Environmental Evaluation Co	ommit	ee (EEC) has:		
L	☐ Found that the proposed project COULD NOT have a significant effect on the environment, and a <u>NEGATIVE DECLARATION</u> will be prepared.						
	☐ Found 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 project proponent. <u>A MITIGATED NEGATIVE DECLARATION</u> will be prepared.						
	☐ Found that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.						
□ Found 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 measures 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.							
	☐ Found that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIF or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions						

CALIFORNIA DEPARTMENT OF FISH AND GAME DE MINIMIS IMPACT FINDING:

required.

or mitigation measures that are imposed upon the proposed project, nothing further is

Initial Study and NOP Brawley Solar Energy Facility Project

⊔Yes □No			
EEC VOTES	YES	NO	ABSENT
PUBLIC WORKS			
ENVIRONMENTAL HEALTH			
OFFICE EMERGENCY SERVICES			
APCD			
AG			
SHERIFF DEPARTMENT			
ICPDS			
Jim Minnick, Director of Planning/EEC Chairman		Date:	
Signature			

Project Summary

Project Location

The project site is located on approximately 227 acres of privately-owned land in the unincorporated area of Imperial County, CA. The site is approximately one mile north from the City of Brawley's jurisdictional limit (Figure 1). As shown in Figure 2, the project site is south of Baughman Road, west of Best Road, and north of Andre Road. The Union Pacific Railway transects the project site. The City of Brawley Wastewater Treatment Plant is located along the western edge of the project site.

The gen-tie line would originate from the southern edge of the project site and then head west along Andre Road to interconnect to the Imperial Irrigation District's (IID) existing North Brawley Geothermal Power Plant substation, located at Hovley Road and Andre Road. The gen-tie line route would be approximately 1.8 miles.

Project Summary

The project applicant, ORNI 30, LLC, proposes to construct and operate a 40 megawatt (MW) photovoltaic (PV) solar facility with an integrated 40 MW battery storage system (BESS) (not to exceed 80 MW) on approximately 227 acres of privately-owned land. The proposed project would be comprised of bifacial solar PV arrays panels, an on-site substation, BESS building, fiberoptic line or microwave tower, inverters, transformers, underground electrical cables and access roads. The proposed project would connect to the existing North Brawley Geothermal Power Plant substation located southwest of the project site via an approximately 1.8-mile long aboveground 92 kilovolt generation tie line.

Environmental Setting

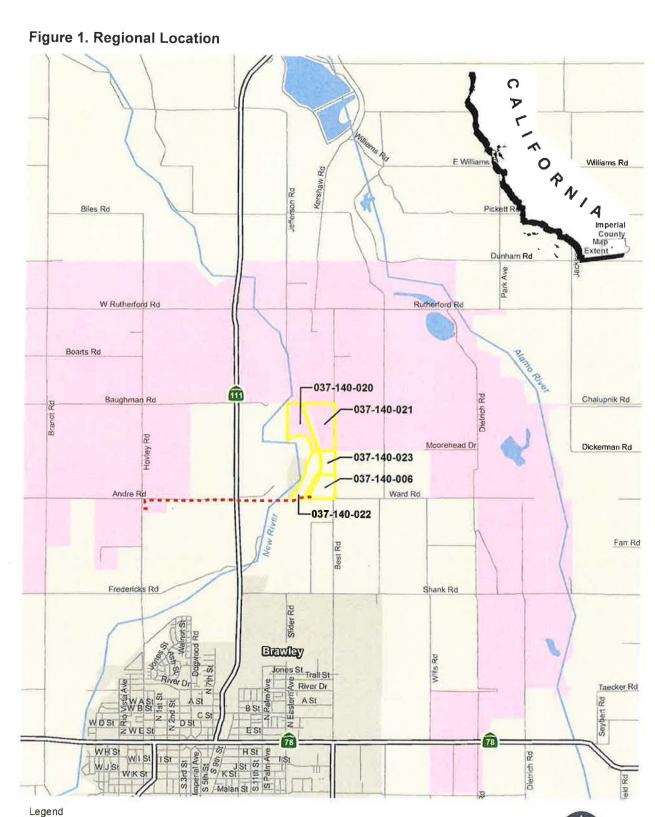
The project site contains alfalfa fields within different levels of harvest. North and east of the project site is undeveloped agricultural land. South of the project site is a mixture of undeveloped agricultural land and dirt lots used for staging activities. The Del Rio Country Club golf course is located to the south of the site. The City of Brawley Wastewater Treatment Plant is located along the western edge of the project site.

General Plan Consistency

The proposed project is located within an unincorporated area of the County. The existing General Plan land use designation is Agriculture. The project site is currently zoned A-2-G (General Agricultural with a Geothermal Overlay). Construction of a solar facility would be allowed within the existing zoning under a Conditional Use Permit.

The County Land Use Ordinance, Division 17, includes the Renewable Energy (RE) Overlay Zone, which authorizes the development and operation of renewable energy projects, with an approved CUP. CUP applications proposed for specific renewable energy project not located in the RE Overlay Zone would not be allowed without an amendment to the RE Overlay Zone. As shown in Figure 1, the northern portion of the project site (APNs 037-140-020 and 037-140-021) is located within the Geothermal Overlay Zone. However, the entire project site (APNs 037-140-020, 037-140-021, 037-140-022, 037-140-023, and 037-140-006) is located outside of the RE Overlay Zone. Therefore, the proposed project requires a General Plan Amendment and Zone Change to

include/classify all five project parcels into the RE Overlay Zone. No change in the underlying General Plan land use (Agriculture) is proposed.

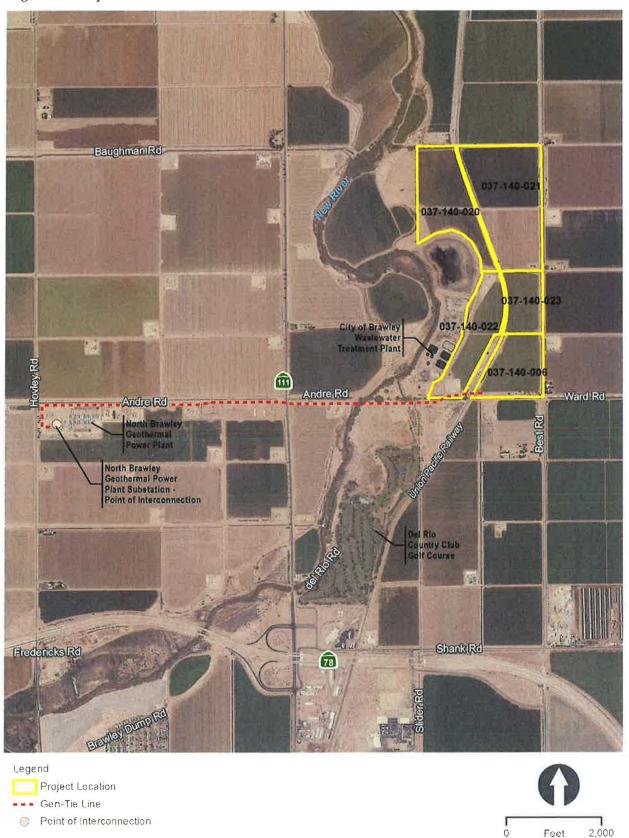


Project Location
Gen-Tie Line

Geothermal Overlay Zone

Miles

Figure 2. Project Site



Evaluation of Environmental Impacts

- 1. A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors, as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).
- 2. All answers must take account of the whole action involved, including off-site as well as onsite, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.
- 3. Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.
- 4. "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from "Earlier Analyses," as described in (5) below, may be cross-referenced).
- 5. Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:
 - a. Earlier Analysis Used. Identify and state where they are available for review.
 - b. Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.
 - c. Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

- Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.
- 7. Supporting Information Sources: A source list should be attached, and other sources used, or individuals contacted should be cited in the discussion.
- 8. This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.
- 9. The explanation of each issue should identify:
 - a. The significance criteria or threshold, if any, used to evaluate each question; and
 - b. The mitigation measure identified, if any, to reduce the impact to less than significance.

I. Aesthetics

Enviro	nmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact			
Except	Except as provided in Public Resources Code Section 21099, would the project:							
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 building within a state scenic highway?							
с)	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 points). 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?	⊠			а			

Impact Analysis

- a) No Impact. According to the Conservation and Open Space Element of the Imperial County General Plan, the project site is not located within an area that has been formally identified as a federal, state, or county scenic vista (County of Imperial 2016). No scenic vistas or areas with high visual quality would be disrupted. Thus, no impact is identified for this issue area and no further analysis is warranted.
- b) No Impact. According to the California Department of Transportation (Caltrans) California Scenic Highway Mapping System (Caltrans 2018), the project site is not located within a state scenic highway corridor, nor are there any state scenic highways located in proximity to the project site. The proposed project would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic building within a state scenic highway. Therefore, no impact is identified for this issue area and no further analysis is warranted.
- c) Potentially Significant Impact. Although the project site is not located near a scenic highway or designated scenic vista, the proposed project may result in a change to the look and rural character of the surrounding area. Therefore, a potentially significant impact is identified for this issue area. A visualization study will be prepared for the project and this issue will be addressed in the EIR.
- d) **Potentially Significant Impact.** Minimal lighting is required for project operation and is limited to safety and security functions. All lighting will be directed away from any public right-

of-way; however, there are no heavily traveled public roadways in immediate proximity to the project site.

The solar panels will be constructed of low reflective materials; therefore, it is not anticipated that they would result in creating glare. Additionally, the proposed project is located in a rural undeveloped area of Imperial County. There are no established residential neighborhoods immediately adjacent to the project site. However, there are three residences located immediately east of the project site along Best Road. Although the proposed project is not expected to create a new source of substantial light or glare affecting day or nighttime views, a glare study will be prepared for the proposed project and this issue will be addressed in the EIR. Therefore, a potentially significant impact is identified for this issue area.

The Brawley Municipal Airport is located approximately 1.5 miles south of the project site. Although the solar panels will be constructed of low reflective materials, the potential for glare to impact aircraft will be analyzed further in the EIR.

II. Agriculture and Forestry Resources

Enviror	nmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact	
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 Department 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 regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:						
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?	⊠				

Impact Analysis

a) Potentially Significant Impact. According to the farmland maps prepared by the California Department of Conservation (DOC) (California DOC 2018), the majority of the project site is designated as Farmland of Statewide Importance, with a pocket of Prime Farmland located in the southern portion of the project site. Therefore, implementation of the proposed project

- may result in a potentially significant impact associated with the conversion of Prime Farmland and Farmland of Statewide Importance to non-agricultural use.
- b) Potentially Significant Impact. The project site is currently designated by the General Plan as "Agriculture" and is zoned A-2-G (General Agricultural with a Geothermal Overlay). Pursuant to Title 9, Division 5, Chapter 8 (County of Imperial 2019a), the following uses are permitted in the A-2 zone subject to approval of a CUP from Imperial County: solar energy electrical generator, battery storage facility, electrical substations, communication towers, and facilities for the transmission of electrical energy. Because the project site is located on lands designated for agricultural uses, this issue will be analyzed in further detail in the EIR.
 - According to the 2016/2017 Imperial County Williamson Act Map produced by the California Department of Conservation's Division of Land Resource Protection (California DOC 2016), the project site is not located on Williamson Act contracted land. Therefore, the proposed project would not conflict with a Williamson Act contract and no impact would occur.
- No Impact. There are no existing forest lands, timberlands, or timberland zoned "Timberland Production" within or immediately adjacent to the project site that would conflict with existing zoning or cause rezoning. Therefore, no impact is identified for this issue area.
- d) **No Impact.** There are no existing forest lands within or immediately adjacent to the project site. The proposed project would not result in the loss of forest land or conversion of forest land to non-forest use. Therefore, no impact is identified for this issue area.
- e) Potentially Significant Impact. Refer to response II. a) above.

III. Air Quality

Enviro	nmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
air poll	available, the significance criteria lution control district may be relie the project:				nent district or
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 adversely affecting a substantial number of people?				×

- a) Potentially Significant Impact. The project site is located within the jurisdiction of Imperial County Air Pollution Control District (ICAPCD) in the Imperial County portion of the Salton Sea Air Basin. Construction of the proposed project would create temporary emissions of dust, fumes, equipment exhaust, and other air contaminants that may conflict with the ICAPCD's rules and regulations. No stationary source emissions are proposed from the proposed project; however, temporary construction emissions have the potential to result in a significant air quality impact. An air quality and greenhouse gas study will be prepared to analyze the proposed project's consistency with air quality plans, and will be included in the EIR analysis.
- b) Potentially Significant Impact. Currently, the Salton Sea Air Basin is either in attainment or unclassified for all federal and state air pollutant standards, with the exception of the federal ozone (O₃), particulate matter less than 10 microns in diameter (PM₁₀) and particulate matter less than 2.5 microns in diameter (PM_{2.5}) standards, and state standards for O₃ and PM₁₀. Air pollutants transported into the Salton Sea Air Basin from the adjacent South Coast Air Basin (Los Angeles County, San Bernardino County, Orange County, and Riverside County) and Mexicali (Mexico) substantially contribute to the non-attainment conditions in the Salton Sea Air Basin. A potentially significant impact is identified for this issue area. An air quality and greenhouse gas study will be prepared to analyze the proposed project's potential air quality impacts and will be included in the EIR analysis.
- c) Potentially Significant Impact. The project site is located in a rural agricultural area of Imperial County. The nearest sensitive receptor to the project site is a single-family home located as near as 40 feet to the north side of the project site (near the northwest corner of the project site). There are also homes located on the east side of Best Avenue that are as near as 120 feet east of the project site. This issue will be addressed in the air quality and greenhouse gas study and EIR analysis.

d) No Impact. Land uses commonly considered to be potential sources of odorous emissions include wastewater treatment plants, sanitary landfills, food processing facilities, chemical manufacturing plants, rendering plants, paint/coating operations, and concentrated agricultural feeding operations and dairies. The construction and operation of a solar facility is not an odor producer. Therefore, no impact is identified for this issue area.

IV. Biological Resources

Enviro	nmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would	the project:				
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, and 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 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?				×

Impact Analysis

a) Potentially Significant Impact. According to the Conservation and Open Space Element of the General Plan (County of Imperial 2016), numerous special-status species occur in the County, and of particular concern is the western burrowing owl which may have the potential to occur within the project site. Burrowing owls and burrows are commonly found along canals and drains. Although there are no Imperial Irrigation District (IID) canals located within the project site, access roads, canals, and other drainages are located in the project vicinity, such as the Best Canal and Livesley Drain, which are immediately east and south of the project site, respectively. Thus, a potentially significant impact is identified for this issue area. A biological resources report that will address the proposed project's potential impacts on biological resources will be prepared and included in the EIR analysis.

- b) Potentially Significant Impact. Refer to response IV. a) above.
- c) **Potentially Significant Impact.** Currently, the project site contains alfalfa fields at different levels of harvest. The Best Canal and existing drain structure(s) would not be removed, relocated or impacted; and no washes are found within the project site.

The project site is adjacent to the New River and according to the United States Fish and Wildlife Service (USFWS) National Wetland Inventory, there are also several project adjacent freshwater ponds. There does not appear to be ponds within the project site; however, the project site has drainage channels that could potentially be considered jurisdictional waters by California Department of Fish and Wildlife (CDFW) and United States Army Corps of Engineers (USACE). Therefore, a potentially significant impact is identified for this issue area. A jurisdictional waters/wetlands delineation report will be prepared and included in the EIR analysis.

- d) Potentially Significant Impact. Refer to response IV. a) above
- e) Potentially Significant Impact. Refer to response IV. a) above
- f) **No Impact**. The project site is not located in a Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. No impact is identified for this issue area.

V. Cultural Resources

Enviro	nmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would	the project:				
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?	⊠			

- a) Potentially Significant Impact. Currently, the project site contains alfalfa fields at different levels of harvest. The disturbed nature of the site indicates that the presence of significant or undamaged cultural resources on the site is unlikely. Although the proposed project is not expected to cause a substantial adverse change in the significance of a historical resource or archaeological resource, a potentially significant impact could occur if an unanticipated find is discovered. A cultural resources report that will address the proposed project's potential impacts on historic and prehistoric resources will be prepared and this issue will be addressed in the EIR.
- b) Potentially Significant Impact. Refer to response V. a) above.
- c) Potentially Significant Impact. Although unlikely, there is a potential for unknown human remains to be unearthed during earthwork activities. This issue is potentially significant and will be addressed in the EIR.

VI. Energy

	nmental Issue Area: the project:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
а)	Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?		0	⊠	
b)	Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?			×	

Impact Analysis

a) Less than Significant Impact. Information contained in this section is summarized from the Air Quality, Energy, and Greenhouse Gas Emissions Impact Analysis prepared for the project (Vista Environmental 2021a). The proposed project would impact energy resources during construction and operation. Energy resources that would be potentially impacted include electricity, and petroleum-based fuel supplies and distribution systems. The proposed project would not utilize any natural gas during either construction or operation of the proposed project, and no further analysis of natural gas is provided in this analysis.

The following discussion calculates the potential energy consumption associated with the construction and operation of the proposed project and analyzes if any energy utilized by the proposed project is wasteful, inefficient, or unnecessary consumption of energy resources.

Construction Energy

The construction activities for the proposed project are anticipated to include: 1) Site Preparation; 2) PV System Installation and Testing, and 3) Site Clean-up and Restoration. The proposed project would consume energy resources during construction in three (3) general forms:

- Petroleum-based fuels used to power off-road construction vehicles and equipment on the project site, construction worker travel to and from the project site, as well as delivery and haul truck trips (e.g., hauling of construction waste material to off-site reuse and disposal facilities);
- Electricity associated with the conveyance of water that would be used during project construction for dust control (supply and conveyance) and electricity to power any necessary lighting during construction, electronic equipment, or other construction activities necessitating electrical power; and,
- Energy used in the production of construction materials, such as asphalt, steel, concrete, pipes, and manufactured or processed materials such as lumber and glass.

Construction-Related Electricity

During construction of the proposed project, electricity would be consumed to construct the new structures and infrastructure. Electricity would be supplied to the project site by IID and

would be obtained from the existing electrical lines in the vicinity of the project site. The use of electricity from existing power lines rather than temporary diesel or gasoline powered generators would minimize impacts on energy use. Electricity consumed during project construction would vary throughout the construction period based on the construction activities being performed. Various construction activities include electricity associated with the conveyance of water that would be used during project construction for dust control (supply and conveyance) and electricity to power any necessary lighting during construction, electronic equipment, or other construction activities necessitating electrical power. Such electricity demand would be temporary, nominal, and would cease upon the completion of construction. Overall, construction activities associated with the proposed project would require limited electricity consumption that would not be expected to have an adverse impact on available electricity supplies and infrastructure. Therefore, the use of electricity during project construction would not be wasteful, inefficient, or unnecessary.

The proposed project would include installation of an approximately 1.8 mile long overhead power line from the southwest corner of the project site to the North Brawley 1 Substation, which would provide adequate capacity to handle the power generated and utilized by the proposed project. Where feasible, the new service installations and connections would be scheduled and implemented in a manner that would not result in electrical service interruptions to other properties. Compliance with County and IID guidelines and requirements would ensure that the proposed project fulfills its responsibilities relative to infrastructure installation, coordinates any electrical infrastructure removals or relocations, and limits any impacts associated with construction of the project. Construction of the project's electrical infrastructure is not anticipated to adversely affect the electrical infrastructure serving the surrounding uses or utility system capacity.

Construction-Related Petroleum Fuel Use

Petroleum-based fuel usage represents the highest amount of transportation energy potentially consumed during construction, which would be utilized by both off-road equipment operating on the project site and on-road automobiles transporting workers to and from the project site and on-road trucks transporting equipment and supplies to the project site.

The off-road equipment utilized during construction of the proposed project would consume 84,890 gallons of fuel. The on-road trips generated from construction of the proposed project would consume 77,046 gallons of fuel. As such, the combined fuel used from off-road construction equipment and on-road construction trips for the proposed project would result in the consumption of 161,935 gallons of petroleum fuel. This equates to 0.17 percent of the gasoline and diesel consumed annually in Imperial County. As such, the construction-related petroleum use would be nominal, when compared to current county-wide petroleum usage rates.

Construction activities associated with the proposed project would be required to adhere to all State and SCAQMD regulations for off-road equipment and on-road trucks, which provide minimum fuel efficiency standards. As such, construction activities for the proposed project would not result in the wasteful, inefficient, and unnecessary consumption of energy resources. Impacts regarding transportation energy would be less than significant.

Operations-Related Electricity

Operation of the proposed project would result in consumption and production of electricity at the project site. The proposed PV solar panels will generate 97,333,333 kWh per year of electricity and operation of the project will use 1,946,667 kWh per year of electricity, which would result in the net generation of 95,386,667 kWh per year of electricity. This equates to 2.8 percent of the electricity consumed annually by IID. As such, the operations-related electricity use would provide a significant renewable resource for the IID and would help IID achieve the State' Renewable Portfolio Standards requirement for non-carbon sources of electricity. No impact would occur from electricity-related energy consumption from the proposed project.

Operations-Related Vehicular Petroleum Fuel Usage

Operation of the proposed project would result in increased consumption of petroleum-based fuels related to vehicular travel to and from the project site. The proposed project would consume 1,036 gallons of petroleum fuel per year from vehicle travel. This equates to 0.001 percent of the gasoline and diesel consumed in Imperial County annually. As such, the operations-related petroleum use would be nominal, when compared to current petroleum usage rates

It should be noted that, the proposed project would comply with all Federal, State, and County requirements related to the consumption of transportation energy and would provide a non-carbon source of electricity to power electric vehicles in Imperial County. Thus, impacts with regard transportation energy supply and infrastructure capacity would be less than significant and no mitigation measures would be required.

b) Less than Significant Impact. The proposed project would help California meet its Renewable Portfolio Standard of 60 percent of retail electricity sales from renewable sources by the end of 2030 and 100 percent by 2045. The electricity generation process associated with the project would utilize solar technology to convert sunlight directly into electricity. Solar PV technology is consistent with the definition of an "eligible renewable energy resource" in Section 399.12 of the California Public Utilities Code (CPUC) and the definition of "in-state renewable electricity generation facility" in Section 25741 of the CPUC. Therefore, the proposed project would not conflict with or obstruct a state or local plan for renewable energy of energy efficiency. This is considered a less than significant impact.

VII. Geology and Soils

	nmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would	the project:		,		
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?				\boxtimes
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 18-1B of the Uniform Building Code (1994), creating substantial direct or indirect risk to life or property?	⊠			
e)	Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?				×
f)	Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?				

Impact Analysis

- ai) **No Impact.** According to the California Earthquake Hazards Zone Application (California DOC 2019), the project site is not located within a State of California, Alquist-Priolo Earthquake Fault Zone. The nearest Alquist-Priolo Earthquake Fault Zone is located approximately 4.75 miles from the project site. Therefore, no impact is identified for this issue area.
- aii) Potentially Significant Impact. The project site is located in the seismically-active Imperial Valley in Southern California and considered likely to be subjected to moderate to strong ground motion from earthquakes in the region. The project site could be affected by the occurrence of seismic activity to some degree but no more than the surrounding properties. A potentially significant impact has been identified for this issue area. A geotechnical report that will address the proposed project's potential impacts on geology and soils will be prepared and this issue will be addressed in the EIR.
- aiii) Potentially Significant Impact. Liquefaction occurs when granular soil below the water table is subjected to vibratory motions, such as vibratory motion produced by earthquakes. With strong ground shaking, an increase in pore water pressure develops as the soil tends to reduce in volume. If the increase in pore water pressure is sufficient to reduce the vertical effective stress (suspending the soil particles in water), the soil strength decreases, and the soil behaves as a liquid (similar to quicksand). Liquefaction can produce excessive settlement, ground rupture, lateral spreading, or failure of shallow bearing foundations.

Four conditions are generally required for liquefaction to occur:

- 1) The soil must be saturated (relatively shallow groundwater).
- 2) The soil must be loosely packed (low to medium relative density).
- 3) The soil must be relatively cohesionless (not clayey).
- 4) Groundshaking of sufficient intensity must occur to function as a trigger mechanism.

All these conditions may exist to some degree at the project site. Therefore, there is a potentially significant impact associated with liquefaction. A geotechnical report that will address the proposed project's potential impacts on geology and soils will be prepared and this issue will be addressed in the EIR.

- aiv) **No Impact.** According to Figure 2: Landslide Activity in the Seismic and Public Safety Element of the General Plan (County of Imperial 1997), the project site is not located in an area that is prone to landslide hazards. Furthermore, the project site and surrounding area is relatively flat. Therefore, no impact is identified for this issue area.
- b) Less than Significant Impact. According to Figure 3: Erosion Activity in the Soil the Seismic and Public Safety Element of the General Plan (County of Imperial 1997), the project site is within a generally flat area with low levels of natural erosion. However, soil erosion can result during construction as grading and construction can loosen surface soils and make soils susceptible to wind and water movement across the surface. Impacts are not considered significant because erosion would be controlled on-site in accordance with Imperial County standards including preparation, review, and approval of a grading plan by the Imperial County Engineer. Implementation of Imperial County standards would reduce the potential impacts to a less than significant level.
- c) Potentially Significant Impact. Near surface soils within the project site will need to be identified to determine if the soils are unstable. Therefore, this issue is potentially significant and will be analyzed in the EIR.
- d) **Potentially Significant Impact.** Near surface soils within the project site will need to be identified to determine if they consist of soils having expansion potential. Therefore, this issue is potentially significant and will be analyzed in the EIR.
- e) No Impact. The proposed project would not require the installation of septic tanks or alternative wastewater disposal systems. The proposed solar facility would be remotely

- operated, controlled and monitored and with no requirement for daily on-site employees. Therefore, no impact is identified for this issue area.
- f) Potentially Significant Impact. Many paleontological fossil sites are recorded in Imperial County and have been discovered during construction activities. Paleontological resources are typically impacted when earthwork activities, such as mass excavation cut into geological deposits (formations) with buried fossils. It is not known if any paleontological resources are located on the project site. The proposed project's potential to impact paleontological resources will be addressed in the EIR.

VIII. Greenhouse Gas Emissions

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

- a) Potentially Significant Impact. In the long-term, the proposed project is expected to provide a benefit with respect to reduction of greenhouse gas emissions. However, the proposed project has the potential to generate greenhouse gas emissions during construction, in addition to construction worker trips to and from the project site. Thus, a potentially significant impact is identified for this issue area. An air quality and greenhouse gas study will be prepared for the proposed project, and this issue will be addressed in the EIR.
- b) Potentially Significant Impact. Refer to response VIII. a) above.

IX. Hazards and Hazardous Materials

Enviro	nmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would	the project:				
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 likely 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 a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise 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?			×	

Impact Analysis

a) Less than Significant Impact. Construction of the proposed project will involve the limited use of hazardous materials, such as fuels and greases to fuel and service construction equipment. No extremely hazardous substances are anticipated to be produced, used, stored, transported, or disposed of as a result of project construction. Operation of the proposed project will be conducted remotely. Therefore, no habitable structures (e.g. housing or operation and maintenance [O&M] building) are proposed on the project site.

Regular and routine maintenance of the proposed project may result in the potential to handle hazardous materials. However, the hazardous materials handled on-site would be limited to small amounts of everyday use cleaners and common chemicals used for maintenance. The applicant will be required to comply with State laws and County Ordinance restrictions, which regulate and control hazardous materials handled on-site. Such hazardous wastes would be transported off-site for disposal according to applicable State and County restrictions and laws governing the disposal of hazardous waste during construction and operation of the project. Therefore, this is considered a less than significant impact.

- b) Less than Significant Impact. Refer to response IX. a) above.
- c) No Impact. The project site is not located within 0.25 mile of an existing or proposed school. No impact is identified for this issue area.
- d) **No Impact**. Based on a review of the Cortese List conducted in May 2021, the project site is not listed as a hazardous materials site. No impact is identified for this issue area.
- e) Potentially Significant Impact. The project site is within 2 miles of a public airport. The nearest public airport is the Brawley Municipal Airport located approximately 1.5 miles south of the project site. However, the project site is outside of the airport compatibility zones of the Brawley Municipal Airport (County of Imperial 1996). Although the solar panels will be constructed of low reflective materials, the potential for glare to impact aircraft will be analyzed further in the EIR.
- f) Less than Significant Impact. The proposed project is not expected to impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. The project applicant will be required, through the conditions of approval, to prepare a street improvement plan for the project that will include emergency access points and safe vehicular travel. In addition, local building codes would be followed to minimize flood, seismic, and fire hazard. Therefore, the proposed project would result in a less than significant impact associated with the possible impediment to emergency plans.
- g) Less than Significant Impact. The project site is located in the unincorporated area of Imperial County. According to the Seismic and Public Safety Element of the General Plan (County of Imperial 1997), the potential for a major fire in the unincorporated areas of the County is generally low.

Proposed project facilities would be designed, constructed, and operated in accordance with applicable fire protection and other environmental, health, and safety requirements (e.g., CPUC safety standards). Primary access to the project site would be located off Best Avenue. A secondary emergency access road would be located in the northwest portion of the project site. Access roads would also be constructed with an all-weather surface, to meet the County Fire Department's standards. Points of ingress/egress would be accessed via locked gates that can be opened by any emergency responders. Additionally, water for emergency fire suppression would likely be provided by water trucks during construction and the existing ground storage tank on-site which is filled by the Best Canal during operation. Based on these considerations, a less than significant impact is identified for this issue area.

X. Hydrology and Water Quality

Environmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:	¥			
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 that the project may impede 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:				
 result in substantial erosion or siltation on- or off-site; 			\boxtimes	
 substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite; 			⊠	
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?		П		×
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?				×

Impact Analysis

a) Potentially Significant Impact. The proposed project has the potential to create urban non-point source discharge (e.g., synthetic/organic chemicals). As runoff flows over developed surfaces, water can entrain a variety of potential pollutants including, but not limited to, oil

- and grease, pesticides, trace metals, and nutrients. These pollutants can become suspended in runoff and carried to receiving waters. If they are not intercepted or are left uncontrolled, the polluted runoff would otherwise freely sheet flow from the project site to the IID Imperial Valley Drains and could result in the accumulation of these pollutants in the receiving waters. Potentially significant water quality impacts have been identified and will be addressed in the EIR.
- b) Less than Significant Impact. During construction, potable water would be brought to the site for drinking and domestic needs. The approximate 20,000 to 30,000 gallons of water per day required during construction would be obtained from the existing ground storage tank on-site which is filled by the Best Canal. This water would be used for earthwork, soil conditioning, dust suppression, and compaction efforts. Because the solar panels will be pole-mounted above ground, they are not considered "hardscape", such as roads, building foundations, or parking areas, as they do not require a substantial amount of impervious material. Estimated annual water consumption for operation and maintenance of the proposed project, including periodic PV module washing, would be approximately 0.81-acre annually, which would be trucked to the project site as needed. Therefore, the panels and their mounting foundation would not impede groundwater recharge. A less than significant impact is identified for this issue area.
- ci) Less than Significant Impact. The proposed project would not substantially alter the existing drainage pattern of the site. It is anticipated that the proposed drainage patterns would be similar to the existing site conditions. The project applicant would be required to implement on-site erosion control measures in accordance with Imperial County standards which require preparation, review, and approval of a grading plan by the Imperial County Engineer. Therefore, the proposed project would not result in substantial erosion or siltation on- or off-site. A less than significant impact is identified for this issue area.
- cii) Less than Significant Impact. The proposed project is not anticipated to generate a significant increase in the amount of runoff water from water use involving solar panel washing. Water will continue to percolate through the ground, as a majority of the surface on the project site will remain pervious. Therefore, the proposed project would not substantially increase the rate of runoff in a manner which would result in flooding on- or off-site or exceed the capacity of existing or planned stormwater drainage systems and provide substantial additional sources of polluted runoff. A less than significant impact is identified for this issue area.
- ciii) Less than Significant Impact. Refer to response X. cii) above.
- civ) **No Impact.** According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (Panel 06025C1025C) (FEMA 2008), the project site is within Zone X, which is an area determined to be outside of the 0.2 percent annual chance of a flood. The proposed project does not propose the placement of structures within a 100-year flood hazard area. Therefore, the proposed project would not impede or redirect flood flows. No impact is identified for this issue area and no further analysis is warranted.
- d) No Impact. The project site is within Zone X, which is an area determined to be outside of the 0.2 percent annual chance of a flood. The project site is not located near any large bodies of water. The Salton Sea is located approximately 12 miles northwest of the project site. Furthermore, the relatively flat project site is approximately 100 miles inland from the Pacific Ocean. Therefore, the proposed project would not risk release of pollutants due to inundation by flood, tsunami or seiche. No impact is identified for this issue area.
- e) No Impact. The proposed project will not involve the use of groundwater nor require dewatering activities. Water to be used during project-related construction activities will obtained from the existing ground storage tank on-site which is filled by the IID Best Canal for earthwork, soil conditioning, dust suppression, and compaction efforts. Water provided by the IID Best Canal would be obtained in conformance with IID construction water acquisition requirements. Therefore, the proposed project will not conflict with or obstruct

implementation of a water quality control plan or sustainable groundwater management plan. No impact is identified for this issue area.

XI. Land Use and Planning

Enviro	nmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would	the project:				
a)	Physically divide an established community?	О			×
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?	×			

Impact Analysis

- a) No Impact. The proposed project is located in a sparsely populated, agriculturally zoned portion of unincorporated Imperial County. There are no established residential communities located within or in the vicinity of the project site. Therefore, implementation of the proposed project would not divide an established community. No impact is identified for this issue area.
- b) **Potentially Significant Impact**. The project parcels are currently zoned as A-2-G (General Agricultural with a Geothermal Overlay). Pursuant to Title 9, Division 5, Chapter 8 (County of Imperial 2019a), the following uses are permitted in the A-2 zone subject to approval of a CUP from Imperial County: solar energy electrical generator, battery storage facility, electrical substations, communication towers, and facilities for the transmission of electrical energy.

The County Land Use Ordinance, Division 17, includes the Renewable Energy (RE) Overlay Zone, which authorizes the development and operation of renewable energy projects, with an approved CUP. CUP applications proposed for specific renewable energy project not located in the RE Overlay Zone would not be allowed without an amendment to the RE Overlay Zone. As shown in Figure 1, the northern portion of the project site (APNs 037-140-020 and 037-140-021) is located within the Geothermal Overlay Zone. However, the entire project site (APNs 037-140-020, 037-140-021, 037-140-022, 037-140-023, and 037-140-006) is located outside of the RE Overlay Zone.

Implementation of the project requires an amendment to the County's General Plan Renewable Energy and Transmission Element, Zone Change, and approval of a CUP, as described below:

- General Plan Amendment: The applicant is requesting a General Plan Amendment to include/classify all five project parcels (Assessor Parcel Nos. [APN] 037-140-006, -020, -021, -022, and -023) into the RE Overlay Zone. No change in the underlying General Plan land use (Agriculture) is proposed.
- **Zone Change:** The entire project site is currently zoned General Agricultural with a Geothermal Overlay (A-2-G). The applicant is requesting a Zone Change to include/classify all five project parcels into the Renewable Energy/Geothermal (REG) Overlay Zone (A-2-REG).
- Conditional Use Permit: Implementation of the project would require the approval of a CUP by the County to allow for the construction and operation of the proposed solar energy facility with an integrated BESS on land zoned General Agricultural with a REG Overlay Zone (A-2-REG).

The proposed General Plan Amendment and Zone Change may result in a conflict with an applicable land use plan, policy or regulation. A potentially significant impact has been identified for this issue, and this issue will be addressed in the EIR.

XII. Mineral Resources

	nmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would	the project:				
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?				×

- a) No Impact. The project site is not used for mineral resource production. According to Figure 8: Imperial County Existing Mineral Resources of the Conservation and Open Space Element of the General Plan (County of Imperial 2016), no known mineral resources occur within the project site nor does the project site contain mapped mineral resources. Therefore, the proposed project would not result in the loss of availability of any known mineral resources that would be of value to the region and the residents of California nor would the proposed project result in the loss of availability of a locally important mineral resource.
- b) No Impact. Refer to Response XIII. a) above.

XIII. Noise

100000000000000000000000000000000000000	nmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would	the project 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?	0			
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?				

Impact Analysis

Less than Significant Impact. Information contained in this section is summarized from the Noise Impact Analysis prepared for the project (Vista Environmental 2021b). The following section analyzes the potential noise emissions associated with the temporary construction activities and long-term operations of the proposed project and compares the noise levels to the County standards.

Construction-Related Noise

The construction activities for the proposed project are anticipated to include: 1) Site Preparation; 2) PV System Installation and Testing, and 3) Site Clean-up and Restoration. Noise impacts from construction activities associated with the proposed project would be a function of the noise generated by construction equipment, equipment location, sensitivity of nearby land uses, and the timing and duration of the construction activities. The nearest sensitive receptors to the project site are single-family homes located as near as 40 feet to the north side of the project site (near the northwest corner of the project site). There are also homes located on the east side of Best Avenue that are as near as 120 feet east of the project site.

The General Plan Noise Element includes Construction Noise Standards that limits the noise created from construction equipment to 75 dB Leq, averaged over an eight (8) hour period at the nearest sensitive receptor. In addition, the Construction Noise Standards limit construction equipment operation to between the hours of 7 a.m. to 7 p.m., Monday through Friday, and 9 a.m. to 5 p.m. Saturday. No commercial construction operations are permitted on Sunday or holidays.

For each phase of construction, all construction equipment was analyzed based on being placed in the middle of the project site, which is based on the analysis methodology detailed in FTA Manual for a General Assessment. Since the County's construction noise standard is based on the noise level over an 8-hour period and in a typical day the proposed construction equipment would operate over the entire project site, the use of the methodology detailed in the FTA Manual for a General Assessment would provide a reasonable estimate of the construction-related noise levels created by the proposed project.

Table 1 shows that greatest construction noise impacts would be as high as 53 dBA Leq during the PV system installation and testing phase at the nearest homes to the northwest, northeast, and southeast of the project site. All calculated construction noise levels shown in Table 1 are within the County's construction noise standard of 75 dBA and would also be below the existing ambient daytime noise levels in the vicinity of the nearby homes. Therefore, through adherence to the limitation of allowable construction times provided in the General Plan Noise Element, construction-related noise levels would not exceed any standards established in the General Plan or Noise Ordinance nor would construction activities create a substantial temporary increase in ambient noise levels from construction of the proposed project. Impacts would be less than significant.

Table 1. Construction Noise Levels at the Nearby Homes

Construction Phase	Construction Noise Level (dBA Leq) at:					
	Home to Northwest ¹	Home to Northeast ²	Home to Southeast ³			
Site Preparation	52	52	52			
PV System Installation and Testing	53	53	53			
Site Clean-Up and Restoration	52	52	52			
Construction Noise Threshold ⁴	75	75	75			
Ambient Daytime Noise Level	66.5	60.2	62.0			
Exceed Thresholds?	No	No	No			

¹ The distance from the center of the project site to the home to the northwest was measured at 2,900 feet.

Operational-Related Noise

The proposed project would consist of the development of a solar facility with a BESS and a substation. Since the proposed project would be operated on an unstaffed basis and monitored remotely from the Brawley Geothermal Power Plant control room, operation of the proposed project would not typically generate any additional vehicle traffic on the nearby roadways. As such, potential noise impacts associated with the operations of the proposed project would be limited to onsite noise sources. The proposed PV solar panels do not create any operational noise, however the proposed BESS Enclosures (AC Unit noise), Power Conversion System (PCS), Power Distribution Center (PDC) that would be located at the BESS, and auxiliary transformers, and Battery Step Up Transformer that would be located at the proposed substation are known sources of noise that have been analyzed below.

² The distance from the center of the project site to the homes to the northeast was measured at 2,900 feet.

³ The distance from the center of the project site to the home to the southeast was measured at 2,850 feet.

⁴ Construction Noise Threshold obtained from the General Plan Noise Element (County of Imperial, 2015). Source: Vista Environmental 2021b

Both the General Plan Noise Element and Section 90702.00 provide the same noise level limits at the property line of the nearby homes of 50 dBA Leq-1hour between 7 a.m. and 10 p.m. and 45 dBA Leq-1hour between 10 p.m. and 7 a.m. When the ambient noise level is equal to or exceeds the above noise standards, the proposed noise source shall not exceed the ambient plus 3 dB Leq.

In order to determine the noise impacts from the operation of onsite noise making equipment, noise specifications from previously prepared noise reports were obtained and are shown in Table 2. The noise levels from each source were calculated through use of standard geometric spreading of noise from a point source with a drop-off rate of 6 dB for each doubling of the distance between the source and receiver.

Table 2 shows that the proposed project's onsite operational noise from the anticipated onsite noise sources would not exceed the applicable noise standards at the nearby homes. Therefore, operational onsite noise impacts would be less than significant.

Table 2. Operational Noise Levels at the Nearby Homes

Noise Source	Home to N	Northwest	Home to Northeast		Home to Southeast	
	Distance - Source to Home (feet)	Noise Level ¹ (dBA Leq)	Distance - Source to Home (feet)	Noise Level ¹ (dBA Leq)	Distance - Source to Home (feet)	Noise Level ¹ (dBA Leq)
BESS Enclosures ²	5,050	25	5,100	25	850	40
Power Conversion System ³	5,050	22	5,100	22	850	38
Power Distribution Center ⁴	5,050	22	5,100	22	850	38
Auxiliary Transformers ⁵	5,030	31	5,280	31	1,150	44
Battery Step up Transformer ⁶	5,030	31	5,280	31	850	47
Combined Noise Levels		35		35		50
County Noise Standard ⁷ (day/night)		69.5/67.9	*	63.2/58.6		65.0/59.2
Exceed County Noise Sta	andards?	No/No		No/No		No/No

Notes

² BESS Enclosures is based on a reference noise measurement of 88.6 dBA at 1 meter.

Source: Vista Environmental 2021b

¹ The noise levels were calculated through use of standard geometric spreading of noise from a point source with a drop-off rate of 6 dB for each doubling of the distance between the source and receiver.

³ Power Conversion System is based on a reference noise measurement of 86.1 dBA at 1 meter.

⁴ Power Distribution Center is based on a reference noise measurement of 86.1 dBA at 1 meter.

Auxiliary Transformers are based on a reference noise measurement of 95.1 dBA at 1 meter.
 Battery Step up Transformer is based on a reference noise measurement of 95.1 dBA at 1 meter.

⁷ County Noise Standard based on ambient noise level shown in Error! Reference source not found. plus 3 dB at the nearby homes.

b) **Less than Significant Impact**. The following analyzes the potential vibration impacts associated with the construction and operations of the proposed project.

Construction-Related Vibration Impacts

Vibration impacts from construction activities associated with the proposed project would typically be created from the operation of heavy off-road equipment. The nearest sensitive receptor to the project site is a single-family home located as near as 40 feet to the north side of the project site (near the northwest corner of the project site).

Since neither the Municipal Code nor the General Plan provides any thresholds related to vibration, Caltrans guidance has been utilized, which defines the threshold of perception from transient sources at 0.25 inch per second PPV.

The primary source of vibration during construction would be from the operation of a bulldozer. A large bulldozer would create a vibration level of 0.089 inch per second PPV at 25 feet. Based on typical propagation rates, the vibration level at the nearest home (40 feet away) would be 0.06 inch per second PPV. The vibration level at the nearest home, would be below the 0.25 inch per second PPV threshold detailed above. Impacts would be less than significant.

Operations-Related Vibration Impacts

The proposed project would consist of the operation of a solar energy facility. The on-going operation of the proposed project would not include the operation of any known vibration sources. Therefore, a less than significant vibration impact is anticipated from the operation of the proposed project.

No Impact. The project site is located within 2 miles of a public airport. The nearest airport is the Brawley Municipal Airport located approximately 1.5 miles south of the project site. However, the project site is outside of the airport compatibility zones of the Brawley Municipal Airport (County of Imperial 1996). Therefore, the proposed project would not expose people residing or working in the project area to excess noise levels and no impact is identified for this issue area.

XIV. Population and Housing

Enviro	nmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would	the project:				
а)	Induce substantial unplanned population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?			×	
b)	Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?				⊠

- a) Less than Significant Impact. Development of housing is not proposed as part of the proposed project. No full-time employees are required to operate the proposed project since the project facility will be monitored remotely. However, it is anticipated that maintenance of the facility will require minimal site presence to perform periodic visual inspections and minor repairs. On intermittent occasions, the presence of additional workers may be required for repairs or replacement of equipment and panel cleaning; however, due to the nature of the facility, such actions will likely occur infrequently and would likely come from the existing local workforce. Therefore, the proposed project would not result in a substantial growth in the area, as the number of employees required to operate and maintain the facility is minimal. A less than significant impact is identified for this issue area.
- b) No Impact. No housing exists within the project site. Therefore, the proposed project would not displace any existing people or housing, which would require the construction of replacement housing elsewhere. No impact is identified for this issue area.

XV. Public Services

Environmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
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?	×			
ii. Police Protection?		×		
iii. Schools?				\boxtimes
iv. Parks?				\boxtimes
v. Other public facilities?				×

- Potentially Significant Impact. Fire protection and emergency medical services in the project area are provided by the Imperial County Fire Department. The project site is located in the unincorporated area of Imperial County. According to the Seismic and Public Safety Element of the General Plan (County of Imperial 1997), the potential for a major fire in the unincorporated areas of the County is generally low. Primary access to the project site would be located off Best Avenue. A secondary emergency access road would be located in the northwest portion of the project site. All access roads and the area around the solar blocks (no greater than 500 by 500 feet) would be constructed with all-weather surface and meet the County Fire Department's standards. Points of ingress/egress would be accessed via locked gates that can be opened by any emergency responders. Although the proposed project would be designed, constructed, and operated in accordance with applicable fire protection and other environmental, health, and safety requirements (e.g., CPUC safety standards), the project applicant will be required to consult with the Fire Department to address any fire safety and service concerns (i.e, battery energy storage system) so that adequate service is maintained. The project's potentially significant impacts on fire services will be addressed in the EIR.
- aii) Less than Significant Impact. Police protection services in the project area is provided by the Imperial County Sheriff's Department. Although the potential is low, the proposed project may attract vandals or other security risks and the increase in construction related traffic could increase demand on law enforcement services. Therefore, on-site security systems would be provided and access would be limited to the areas surrounding the project site during construction and operation, thereby minimizing the need for police surveillance. Sixfoot high chain link fencing topped with barbed wire would be installed around the perimeter of the project site at the commencement of construction and site access would be limited to authorized site workers. Points of ingress/egress would be accessed via locked gates. In addition, a motion detection system and closed-circuit camera system may also be installed.

- The site would be remotely monitored 24 hours per day, 7 days per week. In addition, routine unscheduled security rounds may be made by the security team monitoring the site security. Based on these considerations, the proposed project would not result in a need for police protection facility expansion and a less than significant impact is identified for this issue area.
- aiii) **No Impact.** The proposed project does not include the development of residential land uses that would result in an increase in population or student generation. Additionally, construction of the proposed project would not result in an increase in student population within the Imperial County's School District since it is anticipated that construction workers would commute in during construction operations. Therefore, no impact is identified for this issue area and no further analysis is warranted.
- aiv) **No Impact.** Although maintenance of the project facility will require minimal site presence to perform periodic visual inspections and minor repairs, no full-time employees are required to operate the proposed project because the project facility will be monitored remotely. Therefore, substantial permanent increases in population that would adversely affect local parks is not expected. No impact is identified for this issue area and no further analysis is warranted.
- av) **No Impact.** Although maintenance of the project facility will require minimal site presence to perform periodic visual inspections and minor repairs, no full-time employees are required to operate the proposed project because the project facility will be monitored remotely. Therefore, substantial permanent increases in population that would adversely affect libraries and other public facilities (such as post offices) is not expected. The proposed project is not expected to have an impact on other public facilities such as post offices, and libraries. No impact is identified for this issue area and no further analysis is warranted.

XVI. Recreation

Enviro	nmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would	the project:				
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?				×

- a) No Impact. The proposed project would not generate new employment on a long-term basis. As such, the proposed project would not significantly increase the use or accelerate the deterioration of regional parks or other recreational facilities. The temporary increase of population during construction that might be caused by an influx of workers would be minimal and not cause a detectable increase in the use of parks. Additionally, the proposed project would not include or require the expansion of recreational facilities. No impact is identified for this issue area and no further analysis is warranted.
- b) No Impact. Refer to response XVI. a) above.

XVII. Transportation

Enviro	nmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would	the project:				
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 section 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)?		П	⊠	
d)	Result in inadequate emergency access?			×	

- a) Potentially Significant Impact. Operation and maintenance would be conducted remotely, with minimal trips to the project site for panel washing and other solar maintenance. Construction of the proposed project would result in a small increase of traffic to the area, which may result in a potentially significant impact. Therefore, a traffic study will be prepared and this issue area will be addressed in the EIR.
- b) Potentially Significant Impact. Section 15064.3(b) of the CEQA Guidelines provides guidance on determining the significance of transportation impacts and focuses on the use of vehicle miles traveled (VMT), which is defined as the amount and distance of automobile travel associated with a project. Given the nature of the project, after construction, there would be a nominal amount of vehicle trips generated by the project. Once the proposed project is implemented, the proposed project would require intermittent maintenance requiring a negligible amount of traffic trips on an annual basis. However minimal, the proposed project would increase the number of vehicular trips related to construction and the need for intermittent maintenance on an annual basis. Therefore, this issue is potentially significant and will be addressed in the traffic study and EIR analysis.
- c) Less than Significant Impact. To accommodate emergency access, PV panels would be spaced to maintain proper clearance. Proposed project facilities would be designed, constructed, and operated in accordance with applicable fire protection, CPUC safety standards, and other environmental, health, and safety requirements. Primary access to the project site would be located off Best Avenue. All access roads and the area around the solar blocks (no greater than 500 by 500 feet) would be constructed with all-weather surface and meet the County Fire Department's standards. Points of ingress/egress would be accessed via locked gates that can be opened by any emergency responders. Additionally, the project site is split vertically by the existing Union Pacific Railway and already contains an existing roadway off of Best Avenue that traverses across the railroad at-grade. This atgrade crossing would be maintained for access between the eastern and western portions of the project site. Therefore, the proposed project would not increase hazards because of incompatible uses or design features, and impacts are considered less than significant. A

- haul truck route study will be required which will determine the appropriate construction route.
- d) Less than Significant Impact. As previously stated, the PV panels would be spaced to maintain proper clearance. Proposed project facilities would be designed in accordance with applicable fire protection, CPUC safety standards, and other environmental, health, and safety requirements. Primary access to the project site would be located off Best Avenue. A secondary emergency access road would be located in the northwest portion of the project site. All access roads and the area around the solar blocks (no greater than 500 by 500 feet) would be constructed with all-weather surface and meet the County Fire Department's standards. Points of ingress/egress would be accessed via locked gates that can be opened by any emergency responders. Based on this context, impacts are considered less than significant.

XVIII. Tribal Cultural Resources

Enviror	nmental Issue Area;	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project cause a substantial adverse change in the significance of a tribal cultural resource defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that a 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:					scape that is
a)	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 section 5020.1(k)?				
b)	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 Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?				

Impact Analysis

a-b) Potentially Significant Impact. AB 52 was passed in 2014 and took effect July 1, 2015. It established a new category of environmental resources that must be considered under CEQA called tribal cultural resources (Public Resources Code 21074) and established a process for consulting with Native American tribes and groups regarding those resources. Assembly Bill 52 requires a lead agency to begin consultation with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project.

In accordance with AB 52, Imperial County, as the CEQA lead agency, sent an AB 52 consultation request letter to the Torrez Martinez Desert Cahuilla Indians and Quechan Indian Tribe on July 20, 2021. This issue will be further analyzed in the EIR.

XIX. Utilities and Service Systems

Enviro	nmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would	the project:				
a)	Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, 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, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?			×	
e)	Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?				

Impact Analysis

a) Potentially Significant Impact. Approximately 20,000 to 30,000 gallons of water per day would initially be required for grading, dropping to much less for the remainder of the project construction. Construction water needs would be limited to earthwork, soil conditioning, dust suppression, and compaction efforts. Water for construction and operation of the project would be obtained from an existing ground storage tank on-site which is filled by the Best Canal. The proposed project would not require the relocation, expansion, or construction of new storm drainage facilities because the proposed solar facility would not generate a significant increase in the amount of impervious surfaces that would increase runoff during storm events and exceed the capacity of existing or planned stormwater drainage systems. Water from solar panel washing would continue to percolate through the ground, as a majority of the surfaces within the project site would remain pervious.

The wastewater generated during construction would be contained within portable toilet facilities and disposed of at an approved site. The minimal volume of wastewater generated

during construction would not require the relocation expansion, or construction of wastewater treatment facilities.

Further, no habitable structures (e.g. housing or O&M buildings) are proposed on the project site. Therefore, the proposed project would not require or result in the relocation or construction of new or expanded electric power or natural gas.

New telecommunications equipment would be installed at the project substation within the unmanned Mechanical and Electrical Equipment Room. The proposed fiber optic telecommunications cable, once past the POI, would utilize existing transmission lines to connect to the North Brawley substation. The length of this proposed fiber optic telecommunications cable route would be approximately 1.8 miles. Alternatively, a microwave tower 40 to 100-feet tall could replace the need for a fiberoptic line to transmit data offsite. If selected, this microwave tower would be located within the project substation footprint. The project's potential impact on the construction of new telecommunication facilities will be addressed in the EIR.

Once fully constructed, estimated annual water consumption for operation and maintenance of the proposed project, including periodic PV module washing, would be approximately 0.81-acre feet annually (af/y), which would be trucked to the project site as needed. Although water for solar panel washing and fire protection during project operation is not anticipated to result in a significant increase in water demand/use, the proposed project's potential impacts on water supplies will be addressed in the water supply assessment and EIR analysis.

- b) Potentially Significant Impact. Refer to response XIX. a) above.
- c) Less than Significant Impact. The proposed project would generate a minimal volume of wastewater during construction. During construction activities, wastewater would be contained within portable toilet facilities and disposed of at an approved site. Further, no habitable structures (e.g. housing or O&M buildings) are proposed on the project site; therefore, there would be no wastewater generation from the proposed project during operation. The proposed project would not exceed wastewater treatment requirements of the RWQCB. Therefore, a less than significant impact is identified for this issue area.
- d) Less than Significant Impact. Solid waste generation would be minor for the construction and operation of the proposed project. Solid waste will be disposed of using a locally-licensed waste hauling service, most likely Allied Waste. Trash would likely be hauled to the Imperial Landfill (13-AA-0019) located approximately 11 miles south of the proposed project in Imperial. The Imperial Landfill has approximately 12,384,000 cubic yards of remaining capacity and is estimated to remain in operation through 2040 (CalRecycle 2021). Therefore, there is ample landfill capacity in the County to receive the minor amount of solid waste generated by construction and operation of the proposed project.

Additionally, because the proposed project would generate solid waste during construction and operation, they will be required to comply with state and local requirements for waste reduction and recycling; including the 1989 California Integrated Waste Management Act and the 1991 California Solid Waste Reuse and Recycling Access Act of 1991. Also, conditions of the conditional use permit will contain provisions for recycling and diversion of Imperial County construction waste policies. Therefore, a less than significant impact is identified for this issue area.

e) Less than Significant Impact. Refer to response XIX. d) above.

XX. Wildfire

Enviro	nmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
	ed in or near state responsibility an the project:	eas or lands class	sified as very hig	h fire hazard seve	erity zones,
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?				⊠
с)	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?	а			⊠

Impact Analysis

- No Impact. According to the Fire Hazard Severity Zone Viewer provided by the California Department of Forestry and Fire Protection, the proposed project is not located in or near state responsibility areas or lands classified as very high hazard severity zones (California Department of Forestry and Fire Protection 2020). Therefore, the proposed project would not substantially impair an adopted emergency response plan or emergency evacuation plan. No impact is identified for this issue area.
- b) No Impact. The proposed project is not located in or near state responsibility areas or lands classified as very high hazard severity zones (California Department of Forestry and Fire Protection 2020). Therefore, the proposed project would not exacerbate wildfire risks. No impact is identified for this issue area.
- c) Less than Significant Impact. Fire protection and emergency medical services in the area are provided by the Imperial County Fire Department. The proposed project is not located in or near state responsibility areas or lands classified as very high hazard severity zones (California Department of Forestry and Fire Protection 2020). Further, the proposed project is located in an unincorporated area of Imperial County, which has a generally low potential for a major fire (County of Imperial 2016).

The project involves the installation of solar PV panels, an on-site substation, BESS, inverters, transformers, and a 1.8-mile-long aboveground 92 kV gen-tie line. To accommodate emergency access, PV panels would be spaced to maintain proper clearance.

Proposed project facilities would be designed, constructed, and operated in accordance with applicable fire protection, CPUC safety standards, and other environmental, health, and safety requirements. Primary access roads would be located off Best Avenue from the east and would be constructed with an all-weather surface, to meet the County Fire Department's standards. Points of ingress/egress would be accessed via locked gates that can be opened by any emergency responders. The existing east to west roadway that traverses over the existing railroad and connects the two halves of the project site would be maintained. This would serve as a secondary emergency access road. Further, water for emergency fire suppression would likely be provided by water trucks during construction and the existing ground storage tank on-site which is filled by the Best Canal during operation. Therefore, operation and maintenance would not affect the ability of fire personnel to respond to fires or exacerbate fire risk and would continue to be adequately supported by the existing fire protection services. A less than significant impact is identified for this issue area.

d) No Impact. The proposed project is not located in or near state responsibility areas or lands classified as very high hazard severity zones (California Department of Forestry and Fire Protection 2020). Additionally, the proposed project would not 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 is identified for this issue area and no further analysis is warranted.

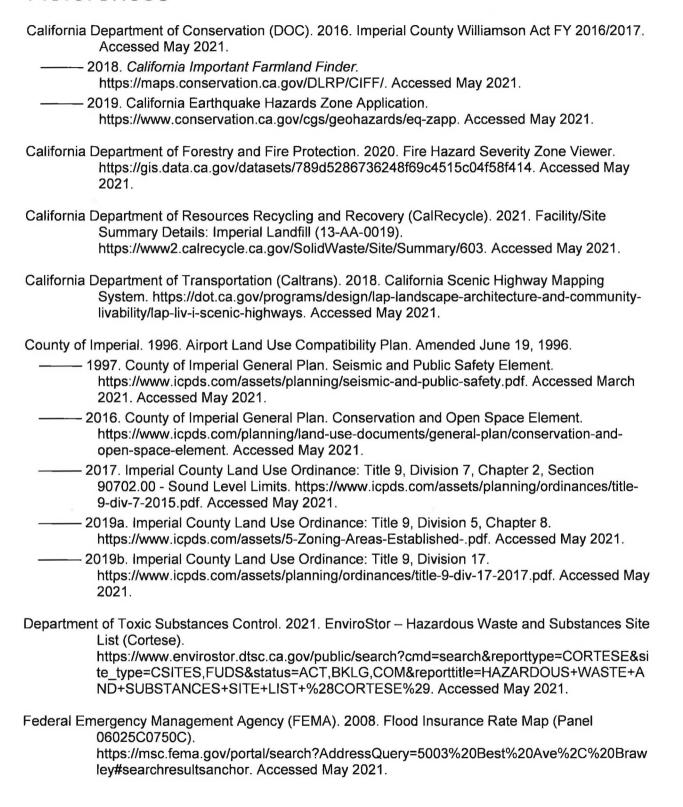
XXI. Mandatory Findings of Significance

Enviro	nmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact			
Would	Would the project:							
a)	Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially 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?	Ø						
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?	×						

Impact Analysis

- a) Potentially Significant Impact. The proposed project has the potential to result in significant environmental effects on biological resources and cultural resources, which could directly or indirectly cause adverse effects on the environment. These issues will be further evaluated in the EIR.
- b) Potentially Significant Impact. Implementation of the proposed project has the potential to result in impacts related to: aesthetics, agricultural resources, air quality, biological resources, cultural resources, geology/soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use/planning, public services, transportation, tribal cultural resources, and utilities/service systems. The proposed project has the potential to result in cumulative impacts with regards to the identified issue areas. Cumulative impacts will be discussed and further analyzed in the EIR.
- c) Potentially Significant Impact. Implementation of the proposed project has the potential to result in impacts related to: air quality, geology/soils and GHG. These potential environmental effects could cause substantial adverse effects on human beings. These issues will be further evaluated in the EIR.

References



Vista Environmental. 2021a. Noise Impact Analysis – Brawley Solar Energy Facility Project. July 14, 2021.

——— 2021b. Air Quality, Energy, and Greenhouse Gas Emissions Impact Analysis - Brawley Solar Energy Facility Project. May 13, 2021.

List of Preparers

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Comment Letters Received on Notice of Preparation

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EXECUTIVE SECRETARY

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Pomo

NAHC HEADQUARTERS 1550 Harbor Boulevard Suite 100 West Sacramento, California 95691 (916) 373-3710 nahc@nahc.ca.gov NAHC.ca.gov

NATIVE AMERICAN HERITAGE COMMISSION

July 26, 2021

David Black, Planner IV

Imperial County Planning and Development Services Department
801 Main Street
El Centro, CA 92243

AUG 06 2021

IMPERIAL COUNTY

PLANNING & DEVELOPMENT SERVICES

Re: 2021070424, GPA# 21-0003, ZC 21-0003, CUP #20-0030 & WSA (BRAWLEY SOLAR ENERGY PROJECT) ORNI 30 Project, Imperial County

Dear Mr. Black:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015. If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March. 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). Both SB 18 and AB 52 have tribal consultation requirements. If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

- 1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:
 - a. A brief description of the project.
 - **b.** The lead agency contact information.
 - c. Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).
 - **d.** A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).
- 2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).
 - **a.** For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).
- 3. <u>Mandatory Topics of Consultation If Requested by a Tribe</u>: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:
 - a. Alternatives to the project.
 - **b.** Recommended mitigation measures.
 - c. Significant effects. (Pub. Resources Code §21080.3.2 (a)).
- 4. <u>Discretionary Topics of Consultation</u>: The following topics are discretionary topics of consultation:
 - a. Type of environmental review necessary.
 - **b.** Significance of the tribal cultural resources.
 - c. Significance of the project's impacts on tribal cultural resources.
 - **d.** If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).
- 5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).
- **6.** <u>Discussion of Impacts to Tribal Cultural Resources in the Environmental Document:</u> If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:
 - a. Whether the proposed project has a significant impact on an identified tribal cultural resource.
 - **b.** Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

- 7. <u>Conclusion of Consultation</u>: Consultation with a tribe shall be considered concluded when either of the following occurs:
 - **a.** The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or
 - **b.** A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).
- 8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).
- 9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).
- 10. Examples of Mitigation Measures That, If Feasible; May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:
 - a. Avoidance and preservation of the resources in place, including, but not limited to:
 - i. Planning and construction to avoid the resources and protect the cultural and natural context.
 - **ii.** Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.
 - **b.** Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
 - i. Protecting the cultural character and integrity of the resource.
 - ii. Protecting the traditional use of the resource.
 - iii. Protecting the confidentiality of the resource.
 - **c.** Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.
 - **d.** Protecting the resource. (Pub. Resource Code §21084.3 (b)).
 - **e.** Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).
 - **f.** Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).
- 11. <u>Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource</u>: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:
 - **a.** The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.
 - **b.** The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.
 - **c.** The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation CalEPAPDE.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code § 65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09-14-05-updated-Guidelines-922.pdf.

Some of SB 18's provisions include:

- 1. <u>Tribal Consultation</u>: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe. (Gov. Code §65352.3 (a)(2)).
- 2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
- 3. <u>Confidentiality</u>: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).
- 4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
 - **a.** The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
 - **b.** Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/.

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

- 1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
 - a. If part or all of the APE has been previously surveyed for cultural resources.
 - **b.** If any known cultural resources have already been recorded on or adjacent to the APE.
 - c. If the probability is low, moderate, or high that cultural resources are located in the APE.
 - d. If a survey is required to determine whether previously unrecorded cultural resources are present.
- 2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
 - **a.** The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.

b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:

- **a.** A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.
- **b.** A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.
- **4.** Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.
 - **a.** Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.
 - **b.** Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.
 - **c.** Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Andrew.Green@nahc.ca.gov.

Sincerely,

Andrew Green
Cultural Resources Analyst

andrew Green

cc: State Clearinghouse

AUGUST 17, 2021

VIA EMAIL: DAVIDBLACK@CO.IMPERIAL.CA.US

David Black

Imperial County Planning and Development Services Department

801 Main Street

El Centro, CA 92243

Governor's Office of Planning & Research

August 18 2021

STATE CLEARING HOUSE

Dear Mr. Black:

NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE BRAWLEY SOLAR ENERTY FACILITY PROJECT, SCH# 2021070424

The Department of Conservation's (Department) Division of Land Resource Protection (Division) has reviewed the Notice of Preparation of a Draft Environmental Impact Report for the Brawley Solar Energy Facility Project (Project). The Division monitors farmland conversion on a statewide basis, provides technical assistance regarding the Williamson Act, and administers various agricultural land conservation programs. We offer the following comments and recommendations with respect to the project's potential impacts on agricultural land and resources.

Project Description

The project applicant proposes to construct and operate a 40 megawatt (MW) photovoltaic (PV) solar facility with an integrated 40 MW battery storage system (BESS) (not to exceed 80 MW) on approximately 227 acres of privately-owned land. The proposed project would be comprised of bifacial solar PV arrays panels, an on-site substation, BESS, fiberoptic line or microwave tower, inverters, transformers, underground electrical cables and access roads. The proposed project would connect to the existing North Brawley Geothermal Power Plant substation located southwest of the project site via an approximately 1.8-mile long aboveground 92 kilovolt generation tie line.

The site is approximately one mile north of the City of Brawley's jurisdictional limit, south of Baughman Road, west of Best Road, and north of Andre Road. The City of Brawley Wastewater Treatment Plant is located along the western edge of the project site.

The project site contains Prime Farmland, and Farmland of Statewide Importance as designated by the Department of Conservation's Farmland Mapping and Monitoring Program.¹

Department Comments

Although conversion of agricultural land is often an unavoidable impact under CEQA analysis, feasible alternatives and/or feasible mitigation measures must be considered. In some cases, the argument is made that mitigation cannot reduce impacts to below the level of significance because agricultural land will still be converted by the project, and therefore, mitigation is not required. However, reduction to a level below significance is not a criterion for mitigation under CEQA. Rather, the criterion is feasible mitigation that lessens a project's impacts. As stated in CEQA statue, mitigation may also include, "Compensating for the impact by replacing or providing substitute resources or environments, including through permanent protection of such resources in the form of conservation easements."²

The conversion of agricultural land represents a permanent reduction in the State's agricultural land resources. As such, the Department advises the use of permanent agricultural conservation easements on land of at least equal quality and size as partial compensation for the loss of agricultural land. Conservation easements are an available mitigation tool and considered a standard practice in many areas of the State. The Department highlights conservation easements because of their acceptance and use by lead agencies as an appropriate mitigation measure under CEQA and because it follows an established rationale similar to that of wildlife habitat mitigation.

Mitigation via agricultural conservation easements can be implemented by at least two alternative approaches: the outright purchase of easements or the donation of mitigation fees to a local, regional, or statewide organization or agency whose purpose includes the acquisition and stewardship of agricultural conservation easements. The conversion of agricultural land should be deemed an impact of at least regional significance. Hence, the search for replacement lands should not be limited strictly to lands within the project's surrounding area.

¹ California Department of Conservation, Division of Land Resource Protection, Farmland Mapping and Monitoring Program, https://maps.conservation.ca.gov/DLRP/CIFF/

² Public Resources Code Section 15370, Association of Environmental Professionals, 2020 CEQA, California Environmental Quality Act, Statute & Guidelines, page 284, https://www.califaep.org/docs/2020 ceqa book.pdf

A source that has proven helpful for regional and statewide agricultural mitigation banks is the California Council of Land Trusts. They provide helpful insight into farmland mitigation policies and implementation strategies, including a guidebook with model policies and a model local ordinance. The guidebook can be found at:

http://www.calandtrusts.org/resources/conserving-californias-harvest/

Of course, the use of conservation easements is only one form of mitigation that should be considered. Any other feasible mitigation measures should also be considered

The Department recommends further discussion of the following issues:

- Type, amount, and location of farmland conversion resulting directly and indirectly from implementation of the proposed project.
- Impacts on any current and future agricultural operations in the vicinity; e.g., land-use conflicts, increases in land values and taxes, loss of agricultural support infrastructure such as processing facilities, etc.
- Incremental impacts leading to cumulative impacts on agricultural land. This would include impacts from the proposed project, as well as impacts from past, current, and likely future projects.
- Proposed mitigation measures for all impacted agricultural lands within the proposed project area.

Conclusion

Thank you for giving us the opportunity to comment on the Notice of Preparation of a Draft Environmental Impact Report for the Brawley Solar Energy Facility Project. Please provide this Department with notices of any future hearing dates as well as any staff reports pertaining to this project. If you have any questions regarding our comments, please contact Farl Grundy, Associate Environmental Planner via email at Farl.Grundy@conservation.ca.gov.

Sincerely,

Monique Wilber

Monique Wilber

Conservation Program Support Supervisor

150 SOUTH NINTH STREET EL CENTRO, CA 92243-2850



TELEPHONE: (442) 265-1809 FAX: (442) 265-1799

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AUG 24 2021

IMPERIAL COUNTY
PLANNING & DEVELOPMENT SERVICES

August 24, 2021

Jim Minnick, Director Imperial County Planning & Development Services 801 Main Street El Centro, CA 92243

SUBJECT:

Notice of Preparation of a Draft Environmental Impact Report for Brawley Solar

Energy Facility Project

Dear Mr. Minnick:

The Imperial County Air Pollution Control District (Air District) received your notice and has the following general comments on the scope of the review for the Brawley Solar Energy Facility Project (Project). As you know, the Air District's established programs help to keep the quality of air in Imperial County from declining. The programs, Rules and Regulations of the Air District in conjunction with the California Environmental Quality Act (CEQA), the most current CEQA Air Quality Handbook for Imperial County (CEQA Handbook), and the Air District's State Implementation Plans (SIP's) for Ozone, PM_{2.5} and PM₁₀ work together to assure that air quality improves or does not degrade. Currently, the non-attainment status of "moderate" for ozone, "moderate" for PM_{2.5} and the maintenance requirements for PM₁₀ are the driving criteria in establishing the thresholds for NOx, ROG, PM₁₀, SOx and CO found in the CEQA Handbook. These thresholds and their significance are explained under Section 6 of the CEQA handbook, which describes the preparation of an Air Quality Analysis for an Environmental Impact Report (EIR) for nonrenewable projects. The Air District will look closely at the potential impacts, both direct and indirect, as a result of the proposed project.

When exploring the impacts of renewable projects, it is a common misconception that these types of projects are not a significant source of air pollution. While it is true that renewable projects that do not employ fuel based combustion units as supplemental power are typically cleaner projects during their operational phases, in most cases construction and cumulative impacts have the potential to cause adverse air quality impacts. Specifically, PM10 and NOx emissions are the

primary pollutants of concern during the construction and operational phases of these types of renewable projects. Historical experience has demonstrated that shortened construction periods not previously analyzed during the CEQA process creates a potential for elevated levels of NOx emissions, as well as elevated levels of PM10 during earthmoving activities. For your convenience below are highlights of the elements involved in an **Air Quality Analysis**.

A thorough analysis should include a description, impacts and health consequences of all air quality and emissions. The analysis should be conducted using APCD approved modeling factors. The analysis should include short and long term emissions as well as daily and yearly emission calculations. Project alternatives should be included along with a thorough emissions analysis. A description of the County's attainment status, both at the state and federal levels, as well as any regulatory restrictions to the project, should be included. All temporary construction and grading impacts should quantify fugitive dust and combustion emissions and propose mitigation measures.

Therefore, a **Tier I Preliminary Analysis** should be performed in order to assess the level of significance of potential impacts. This analysis should include an overview containing a complete description of the Project (including the proposed Battery Energy Storage System component) in its current existing conditions, what the proposed development will be, how that will change the existing conditions, and should also provide answers to the questions in the **White Paper** (attached for your reference). These questions are designed to assess the project's level of significance before and after proposed mitigation. Compliance with **Regulation VIII** is required for all construction activities, including a **Construction Dust control Plan (CDCP)**, as well as **notification 10 days prior** to the commencement of all construction activities.

In order to identify NO_x emissions created during the construction phase of the renewable project, a **Construction Equipment List** detailing the equipment type, make, model, year, horsepower, hours of **daily** operation, date arrived onsite, and date removed from site should be provided to the Air District in Excel format.² This is to ensure NO_x emissions during the construction period remain under the CEQA thresholds of significance.

¹ Such as using the most current CalEEMod.

² The Equipment List submittal will require a written commitment by the applicant to a submittal schedule agreed upon between the applicant and the Air District

In regards to cumulative impacts, which occur during the operational phase of renewable projects, PM₁₀ is of main concern. Therefore, an **Operational Dust Control Plan (ODCP)** is required detailing how dust emissions will be controlled and maintained during the operational phase of the project.³ An initial site visit is required to confirm the elements of any draft ODCP before it can be finalized by the Air District. After this, continual site visits will typically occur on a yearly basis. Please note that an ODCP is intended to provide pertinent information specific to your operation for the reduction of fugitive dust emissions created by the ongoing operations at your facility.

Our rules and regulations can be found on our website at https://apcd.imperialcounty.org under the Rules & Regulations. If any questions arise, please feel free to contact our office at (442) 265-1800.

Sincerely, Cartis Blandell

Curtis Blondell

Environmental Coordinator

Reviewed by, Mon ca Soucier

APC Division Manager

³ The ODCP needs to be approved prior to the issuance of the Certificate of Occupancy.





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Since 1911

August 30, 2021

Mr. David Black Planner IV Planning & Development Services Department County of Imperial 801 Main Street El Centro, CA 92243 AUG 30 2021

IMPERIAL COUNTY
PLANNING & DEVELOPMENT SERVICES

SUBJECT:

NOP of a DEIR for the Brawley Solar Energy Facility Project

Dear Mr. Black:

On July, 2021, the Imperial Irrigation District received from the Imperial County Planning & Development Services Department, a Notice of Preparation of a Draft Environmental Impact Report for the Brawley Solar Energy Facility Project. The applicant, ORNI 30, LLC, is proposing to construct and operate a 40 MW PV solar facility with an integrated 40 MW battery energy storage system, on approximately 227 acres of privately-owned land located about one mile north from the City of Brawley's jurisdictional limit in the unincorporated area of Imperial County, CA (APNs 037-140-006, -020, -021, -022, and -023), south of Baughman Road, west of Best Road, and north of Andre Road. The Union Pacific Railway transects the project site and the City of Brawley Wastewater Treatment Plant is located along the western edge of the project site. The project would be comprised of bifacial solar PV arrays panels, an on-site substation, BESS, fiber optic line or microwave tower, inverters, transformers, underground electrical cables and access roads. The project would connect to the existing North Brawley Geothermal Power Plant substation located southwest of the project site via an approximately 1.8-mile long aboveground 92 kV generation tie line.

The Imperial Irrigation District has reviewed the information and has the following comments:

1. If the project requires temporary construction or permanent electrical service at the distribution level, the applicant should be advised to contact Gabriel Ramirez, IID Customer Project Development Planner, at (760) 482-3300, (760) 482-9257 or e-mail Mr. Ramirez at gramirez@iid.com. to initiate the customer service application process. In addition to submitting a formal application (available for download at the district website http://www.iid.com/home/showdocument?id=12923), the applicant will be required submit a complete set of plans approved by the County of Imperial (in hardcopy and AutoCad formats) including site plan, plan & profile drawings, one-line diagrams, and electrical loads, panel size, voltage requirements, project schedule, estimated in-service date and and the project's Conditional Use Permit, in addition to the applicable fees, permits, easements and environmental compliance documentation pertaining to the provision of electrical service to the project. The applicant shall be responsible for all costs and mitigation measures related to providing electrical service to the project.

David Black August 30, 2021 Page 2

- 2. Distribution-rated electrical service is limited in the area. A circuit study may be required. Any improvements or mitigation identified in the circuit study to enable the provision of electrical service shall be the financial responsibility of the applicant.
- 3. IID water facilities that may be impacted include Best Canal, Best Lateral 1, Livesley Drain, and Best Drain. The applicant may not use IID's canal or drain banks to access the project site. Any abandonment of easements or facilities shall be approved by IID based on systems (Irrigation, Drainage, Power, etc.) needs.
- 4. To insure there are no impacts to IID facilities, applicant should submit project plans, including grading & drainage and fencing plans, to IID Water Department Engineering Services for review and comment prior to final project design and CUP approval. IID WDES can be contacted at (760) 339-9265 for further information on this matter.
- 5. The project may impact IID drains with project site runoff flows draining into IID drains. To mitigate impacts, the project may require a comprehensive IID hydraulic drainage system analysis. IID's hydraulic drainage system analysis includes an associated drain impact fee.
- 6. A construction storm water permit from the California Regional Water Quality Control Board is required before commencing construction and an industrial storm water permit from CRWQCB is required for the operation of the proposed facility. The project's Storm Water Pollution Prevention Plan and storm water permits from CRWQCB should be submitted to IID for review.
- 7. For information on procuring construction water, the applicant should contact IID North End Division at (760) 482-9900.
- 8. The impacts to the Salton Sea, due to loss or reduction of agricultural runoff caused by agricultural land conversion to urban use shall require discussion in the EIR. Due to the potential loss or reduction of inflow to the Salton Sea and to IID drains with its concurrent environmental impacts, the applicant should address this issue as well as provide analysis that the project does not negatively impact the IID Water Conservation and Transfer Draft Habitat Conservation Plan, the existing Section 7 Biological Opinion and the California Endangered Species Act Permit 2081.
- 9. An assessment or discussion of cumulative impacts considering other non-agricultural facilities whose water use (or potential water use) would reduce the inflow conveyed to IID drains and the Salton Sea is necessary. It is advisable that the applicant present a cumulative impact analysis on inflow to IID drains and the Salton Sea.

The documents mentioned previously are available at:

 The HCP is part of the IID Water Conservation and Transfer Project, Final EIR/EIS and can be found at <u>Water/Library/QSA-Water-Transfer/Environmenta-Assessment/Permits/Final EIREIS</u>; Volume II, Appendix A Species Covered by the HCP. The HCP in the Draft EIR/EIS may contain small changes from the final version of the EIR/EIS. It is in a different appendix in the draft that the final David Black August 30, 2021 Page 3

EIR/EIS (Appendix C). Until the final HCP/Natural Community Conservation Plan is approved, IID uses the draft HCP in the draft document, which can be accessed at Water/Library/QSA-Water-Transfer/Environmental-Assessment).

- The Biological Opinion (federal ESA permit) is at https://www.iid.com/Imperial-Irrigation-District/Salton-Sea-Areas.
- The CESA 2081 (the water transfer operates under this state ESA permit until the NCCP is approved) can be found at https://www.iid.com/water/library/qsa-water-transfer/environmental-assessments-permits/cesa-compliance.
- The MMRP (Mitigation Monitoring and Report Program) is at https://www.iid.com/Water/Library/QSA-Water-Transfer/Mitigation.
- 10. In order to obtain a water supply from IID for a non-agricultural project, the project proponent will be required to comply with all applicable IID policies and regulations and may be required to enter into a water supply agreement. Such policies and regulations require, among other things, that all potential environmental and water supply impacts of the project be adequately assessed, appropriate mitigation developed if warranted, including any necessary approval conditions adopted by the relevant land use and permitting agencies.
- 11. If IID implements a water allocation or apportionment program pursuant to the IID Equitable Distribution Plan, or any amending or superseding policy for the same or similar purposes, during all or any part of the term of said water supply agreement, IID shall have the right to apportion the project's water as an industrial water user. Information on how to obtain a water supply agreement can be found at the IID website https://www.iid.com/water/municipal-industrial-and-commercial-customers or by contacting Justina Gamboa-Arce, Water Resources Planner at (760) 339-9085 or igamboaarce@iid.com.
- 12. Any construction or operation on IID property or within its existing and proposed right of way or easements including but not limited to: surface improvements such as proposed new streets, driveways, parking lots, landscape; and all water, sewer, storm water, or any other above ground or underground utilities; will require an encroachment permit, or encroachment agreement (depending on the circumstances). A copy of the IID encroachment permit application and instructions for its completion are available at https://www.iid.com/about-iid/department-directory/real-estate. The IID Real Estate Section should be contacted at (760) 339-9239 for additional information regarding encroachment permits or agreements.
- 13. In addition to IID's recorded easements, IID claims, at a minimum, a prescriptive right of way to the toe of slope of all existing canals and drains. Where space is limited and depending upon the specifics of adjacent modifications, the IID may claim additional secondary easements/prescriptive rights of ways to ensure operation and maintenance of IID's facilities can be maintained and are not impacted and if impacted mitigated. Thus, IID should be consulted prior to the installation of any facilities adjacent to IID's facilities.

David Black August 30, 2021 Page 4

Certain conditions may be placed on adjacent facilities to mitigate or avoid impacts to IID's facilities

- 14. An IID encroachment permit is required to utilize existing surface-water drainpipe connections to drains and receive drainage service from the district. Surface-water drainpipe connections are to be modified in accordance with IID Water Department Standards.
- 15. Any new, relocated, modified or reconstructed IID facilities required for and by the project (which can include but is not limited to electrical utility substations, electrical transmission and distribution lines, water deliveries, canals, drains, etc.) need to be included as part of the project's CEQA and/or NEPA documentation, environmental impact analysis and mitigation. Failure to do so will result in postponement of any construction and/or modification of IID facilities until such time as the environmental documentation is amended and environmental impacts are fully analyzed. Any and all mitigation necessary as a result of the construction, relocation and/or upgrade of IID facilities is the responsibility of the project proponent.

Should you have any questions, please do not hesitate to contact me at 760-482-3609 or at dvargas@iid.com. Thank you for the opportunity to comment on this matter.

Respectfully,

Donald Vargas

Compliance Administrator II

PUBLIC COMMENTS FOR THE ENVIRONMENTAL EVALAUATION COMMITTEE MEETING ON AUGUST 12, 2021

FOR THE PROPOSED BRAWLEY SOLAR ENERGY FACILITY PROJECT

COMMENTS SUBMITTED BY CAROLYN ALLEN FOR MYSELF & ON BEHALF OF DONNA TISDALE,

AND ON BEHALF OF BOTH OF US AS MEMBERS OF BACKCOUNTRY AGAINST DUMPS (BAD)

AND ALSO ON BEHALF OF DONBEE FARMS.

These comments and references are for the record.

- We strongly oppose this large scale industrial solar project the Brawley Solar Energy Facility
 Project proposed by ORNI 30 LLC. The Initial Study for this project showed 36 areas with
 "Potentially Significant Impacts".
 All of these impacts need to fully considered and addressed.
- 2) Small point of use solar is a much better option than the large scale industrial solar projects like this one that wreck havoc on our farming communities.
- 3) We oppose the loss of farmland due to conversion to solar that this project and others like it cause. Our country's precious farm ground is finite and should be saved and protected for the future. These large solar projects cause the loss of long term agricultural jobs and create only short term temporary jobs. Large solar projects also harm the associated ag support businesses. Our Valley's Ag businesses contributes greatly to this county. This project would convert 227 acres of farmland to solar. See the article 10 Numbers That Show How Much Farmland We're Losing to Development

https://modernfarmer.com/2018/05/10-numbers-that-show-how-much-farmland -were-losing-to-development/

See Imperial County Agricultural Crop and Livestock Report

https://agcom.imperialcounty.org/wp-content/uploads/2021/08/2020-Crop-Report-v2.pdf
Also see Imperial County's Crop Report Plus for 2020

4) The project could potentially cause damage to the crops growing in the nearby fields. For example: heat island effect, excessive dust, spread of weeds, etc.
This is just to name a few possibilities

Page 1



AUG 12 2021
IMPERIAL COUNTY
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- 5) There is the possibility of Soil, Crop and air contamination from the toxic chemicals and materials used for large solar projects. See Leaching Via Weak Spots in Photovoltaic Modules" https://res.mdpi.com/d attachment/energies/energies-14-00692/article deploy/energies-14-00692.pdf
- 6) Growing crops in fields provide habitat for wildlife. This proposed project will destroy that habitat. This loss needs to be taken into consideration.
- 7) The plants in a growing farm field help clean our air. They take in CO2 and release oxygen. Plants sequester carbon. This benefit will be lost for the 227 acres of farmland converted to industrial use by this project
- 8) Project poses a threat of danger to the nearby residents and to people who use the nearby golf course. For example EMF, Dirty Electricity, etc.
- 9) Issues of Glint and Glare problems possible for nearby airport
- 10) Extreme fire hazard from the lithium ion batteries used in Battery Energy Storage Systems See Battery 'Bombs': More Giant Renewable Energy Batteries Explode in Toxic Fireballs At stopthesethings.com
- 11) There is a growing awareness of the huge toxic trash problem that solar panels present .What is and will happen to all of the broken, damaged, expired solar panels. Will they pollute our land and water? Pile up in our landfills.?
- 12) All of the cumulative, direct and indirect impacts of this project need to be taken in to consideration and addressed. The total ramifications and consequences of not just this project but all of the large scale solar projects and other Battery Energy Storage Systems need to be looked at.

Submitted by: Carolyn Allen	

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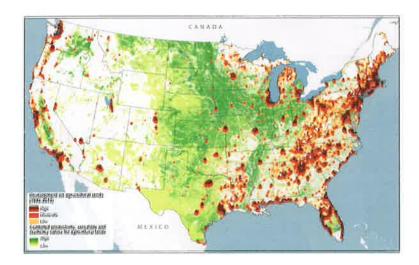
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10 Numbers That Show How Much Farmland We're Losing to Development

MAY 22, 2018

Dan Nosowitz

"Farms Under Threat," a new report from the American Farmland Trust, shows the dire state of our nation's farmlands.



This image, courtesy of American Farmland Trust, shows the conversion of agricultural land to urban and lowdensity residential development between 1992 and 2012.

Photography AFT, Farms Under Threat



The Million Gardens
Movement doesn't
Just help you grow a
garden, we're also
bringing gardens to
kids across the
country = and you
can help. Learn
more at
milliongardensmovement.

The organization's findings, which they are calling "the most comprehensive ever undertaken of America's agricultural lands," aren't hugely shocking, at least at the surface: American farmland is being vacuumed up by development. What's new, though, is the discovery that the development isn't coming only from urban areas expanding outwards — rural areas are also losing farmland rapidly. "The fact is that we have this sort of insidious development that no one's been paying attention to, and we really need to start paying attention," says Julia Freedgood, the assistant VP of programs at the AFT.

Why is this happening? There's no simple answer. One major reason, which has spiraling effects, is that farming is an incredibly difficult and not a very lucrative career path. The average age of the American farmer was nearly 60 in 2012 (the time of the last census); as those farmers retire or pass away, successive generations turn elsewhere for jobs, the land goes fallow and is sold off. Another reason: It's sometimes simply worth more to sell farmland rather than actually farm the land, especially if that farmland is near a city or town. "There's no one to take it over and it's worth more selling to developers, so why not?" That's also part of the reason it's obscenely difficult to find new land for new farmers; land access, according to the National Young Farmers Coalition, is one of the most difficult obstacles for beginning farmers.

This is concerning for a variety of reasons. The obvious one is that farmland produces food, so less farmland means the price of food may rise. The majority of American farmland is devoted to commodity crops = soy, corn, wheat = and many of the uses of those crops are not for direct eating.



7 Smokable Plants You Can Grow That Aren't Marijuana

Brian Barth

So, You Want to Be a Marijuana Farmer?

Dan Nosowitz

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Jason Price

Much of it, though, is used for animal feed, and if the price of animal feed goes up, so goes the price of meat. And, of course, some of the farmland being lost is for so-called "specialty" crops, like fruits and vegetables. But there are other reasons as well. Development on farmland can have negative effects, removing land that animals use as a habitat. Well-operated farms care for the soil, air, and water, and produce viable ecosystems. Economically, the agricultural industry employs millions in all sorts of fields, from machinery to inputs to researchers to retailers to packagers.

We put together a list of some of the AFT's findings that should help to add some (scary) context.

10% of the world's arable acres lie within the United States.

Agriculture contributes \$992 billion to the American economy each year.

31 million acres of farmland lost to development, in total, between 1992 and 2012.

That's **175 acres per hour** of agricultural land

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MILLION GARDENS MOVEMENT lost to development = 3 acres per minute.

It probably comes as no surprise that the expansion of cities and suburbs are responsible for most of the loss in farmland. But 41% of the lost acres actually came from development in rural areas.

The U.S. lost 11 million acres of America's best agricultural land – land with superior soll conditions and weather for growing food – from 1992 to 2012.



Best agricultural land for intensive food and crop production in 2012. Source: AFT, Farms Under Threat.

O.43 PVR: PVR stands for Productivity,
Versatility, and Resiliency, and it's a metric the
American Farmland Trust uses to rate the quality
of farmland. If farmland has a rating above that —
say, O.65 — that makes it great farmland. Below
that, and it's subpar. Farmland with a high rating
is being lost disproportionately quickly, which
means suboptimal farmland will have to be used.
And suboptimal farmland requires more water,
more transportation, more energy, more
fertilizers, and more pesticides to be productive,
all of which are bad for the environment.

Just 17% of American land is ideal for farming. We don't have that much to lose! The amount of the best land lost is about equal to California's entire Central Valley.

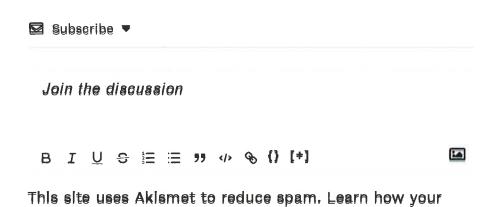
62% of development between 1992 and 2012 took place on agricultural land. The other 38% was primarily forest and simply unused space.

Some types of farmland are more at risk of being swallowed by development than others. 91% of the acreage devoted to fruit trees, tree nuts, and berries are directly in the path of development as they're located in countles that qualify as either metropolitan areas or immediately adjacent to them.

This report is the first part of a multi-year project to better understand farmland use and loss state-by-state, and to better understand the effectiveness of state farmland protection policies. Make sure to read the full, eye-opening "Farms Under Threat" report, and you can also use that link to sign up for updates on the project from the AFT.

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comment data is processed.

Jeff Orrell @ 2 years age

This is old news folks, the hour is later than we think. Read The Unsettling of America by Wendell Berry, 1976?

What can I do? I cry everytime I see a for sale sign go up on a piece of farmland because I know what's going to happen...more developing. If people could look at the land and stop to consider what they're looking at has been there since the dawn of man. Developments are no different to me than graffiti. We're taking what is timeless and putting a permanent stamp on it.

What can I do?

14 de Reply

william f neal @ 1 year age

The above data proves what is happening in our nation and needs to stop

🦸 3 弾 🤝 Reply

John Hoadley (§ 1 year ago

I come from a long history of agricultural family of farmers, my family started farming in the late 1800's, here in the treasure Valley of Bolse Idaho, I myself have been in the seed industry since 1989, and have seen the turn over of prime farm ground in treasure Valley from dirt to concrete and asphalt and fields of fertil viable productive soil to homes and business. The treasure valley is very unique as we are considered the seed meca of the world as we have some of the best growers, the best soil, control of our irrigation and environment, and... Read more »

ib 3 🐠 🦙 Reply

Gretchen Easterberg (1) 1 year ago

Land must be purchased in large acreage masses, and donated to land trust organizations to prevent this development. It's my dream and goal to help to raise money to both donate to land trusts, and also, non-profit organizations must also be organized for farm

land and wilderness land preservation and restoration. Then, I will need help be with this, in terms of learning fundraising skills.

🏚 2 🐠 🤝 Reply

View Replies (1) ¥

Dixie Wong (1) 2 years ago

Wonderful article, I am a realtor. What can we do?

1 9 Reply

View Replies (3) ¥

Roger Hoffecker © 1 year age

There will be no farmland preservation without farmer preservation.

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Article

Leaching via Weak Spots in Photovoltaic Modules

Jessica Nover 1, Renate Zapf-Gottwick 1,*, Carolin Feifel 2, Michael Koch 2 and Juergen Heinz Werner 1

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- * Correspondence: renate.zapf-gottwick@ipv.uni-stuttgart.de

Abstract: This study identifies unstable and soluble layers in commercial photovoltaic modules during 1.5 year long-term leaching. Our experiments cover modules from all major photovoltaic technologies containing solar cells from crystalline silicon (c-Si), amorphous silicon (a-Si), cadmium telluride (CdTe), and copper indium gallium diselenide (CIGS). These technologies cover more than 99.9% of the world market. We cut out module pieces of $5 \times 5 \text{ cm}^2$ in size from these modules and leached them in water-based solutions with pH 4, pH 7, and pH 11, in order to simulate different environmental conditions. Unstable layers open penetration paths for water-based solutions; finally, the leaching results in delamination. In CdTe containing module pieces, the CdTe itself and the back contact are unstable and highly soluble. In CIGS containing module pieces, all of the module layers are more or less soluble. In the case of c-Si module pieces, the cells' aluminum back contact is unstable. Module pieces from a-Si technology also show a soluble back contact. Long-term leaching leads to delamination in all kinds of module pieces; delamination depends strongly on the pH value of the solutions. For low pH-values, the time dependent leaching is well described by an exponential saturation behavior and a leaching time constant. The time constant depends on the pH, as well as on accelerating conditions such as increased temperature and/or agitation. Our long-term experiments clearly demonstrate that it is possible to leach out all, or at least a large amount, of the (toxic) elements from the photovoltaic modules. It is therefore not sufficient to carry out experiments just over 24 h and to conclude on the stability and environmental impact of photovoltaic modules.

Keywords: leaching; long term; photovoltaic modules; delamination; solubility



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1. Introduction

Photovoltaic (PV) modules are not a niche product anymore. The market started with an installed capacity of 20 MW in the early 1990s and increased up to 635 GW of total installed PV modules worldwide at the end of 2019 [1]. By assuming an average lifetime of 30 years, we have to deal with an increasing amount of waste from PV modules of up to 1.7 million tonnes until 2030 [1].

In principle, photovoltaics are a green technology; however, some PV modules contain toxic elements such as lead in the solder ribbons and metalization pastes, or even worse, such as in CdTe technology, the toxic elements Cd and Te in the photoactive layer itself. Many modules using copper indium gallium diselenide (CIGS) also contain cadmium in the so-called CdS buffer layer of the CIGS cells. This situation is mainly possible because PV modules are still excluded from the EU Directive on the restriction of hazardous substances (ROHS 2) in electrical and electronic equipment. This exclusion will remain until the next review of the RoHS 2, which is planned for 2021 [8]. For all other electric and electronic equipment (EEE) on the EU market, the tolerated maximum concentrations by weight in homogeneous materials for lead (Pb) and cadmium (Cd) are 0.1% and 0.01%, respectively. Clearly, in the case of the compounds CdS or CdTe, with 50% of the mass being Cd,

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the RoHS is not obeyed. However, also the technology of modules with crystalline Si cells has a problem with RoHS, although it could easily be overcome by using cell connectors without lead (usually, the solder contains about 40% lead) in the solder. The tiny amount of Pb in the metallization pastes could be kept below the RoHS limits. In 2019, the amount of lead-free metalization pastes in the case of silicon (Si) solar cells was only 30% [_]. At the same time, the world market share of lead-containing solder for cell connectors was over 90% [_].

Most probably, photovoltaic modules, which contain toxic substances, are safe for the users and the environment, at least as long as the modules are not damaged. Nevertheless, what happens if modules are damaged? What happens at the end of their use? Are they "donated" or "exported" like old cars, other old electronic equipment, and waste to countries outside the EU? In the worst case, finally, wherever it may be, the modules are crushed and/or discarded in landfills. What could happen with the toxic elements? In fact, it is no longer a question if these substances are released into in the environment: several studies proved they do and that the release depends on the pH-value of the leaching solvents, as well as on the redox conditions [3–10]. A literature review can be found in [31].

Despite of all these studies [5-11], several questions are open: How are the toxic substances released? What are the weak spots in the modules? Does leaching only occur in the case of delaminated modules, i.e., in modules, that have lost the front glass? In this case, in particular for thin film modules, it would be understandable that the toxic substances are leached from, for example, the CdTe layers, which are no longer protected by the front glass. Does it work the other way around: Are the thin layers leached from the edges of the module (pieces) leading, finally, to delamination? Clearly, after delamination, the leaching would then be accelerated even more, because the leaching solution is now able to attack the thin layers not only from the edges, but also from the surface. Are there any potentially accelerating parameters, like agitation or temperature, regarding the leaching?

The present contribution gives answers to most of these questions via a long-term study. In contrast to previous work, our leaching tests are not only conducted over 24 h as requested by standard leaching tests [, 2-, .], but for more than 1.5 year; some of our results are even taken after almost two years. Furthermore, we analyze not only eluted amounts of toxic substances like cadmium (Cd) and lead (Pb), but also other elements present in the module layers such as zinc (Zn), tellurium (Te), indium (In), gallium (Ga), selenium (Se), aluminum (Al), molybdenum (Mo), and copper (Cu), to identify soluble and, therefore, weak layers in PV modules. Parts of the experimental details were published earlier in German [10]; some results about the leaching of Cd, Te, and Pb up to day 360 were published earlier by us [10]. We find, that, finally, the modules delaminate because of the leaching from the edges of the module pieces. In all kinds of modules, at least one of the layers of the different cell types represents a weak path for the leaching. In the case of CdTe module pieces, the CdTe layer itself and the Mo contact are soluble. In the case of CIGS module pieces, the Zn front contact, the Mo back contact, and the Cd-containing buffer layer are susceptible to strong leaching. For crystalline silicon module pieces, the Al back contact is a weak spot; for amorphous silicon (a-Si) module pieces, also the back contact (Ni) and the intermediate layer containing Zn are identified as weak spots.

Section 2 of the present contribution describes the sample preparation and the leaching conditions and shows how we determine the total amount of elements within each type of our investigated solar modules. Section 3 presents our leaching results. We measured for more than 1.5 years, not only at room temperature, but also at increased temperature, as well as under accelerated leaching conditions. The leaching time constant depends on the module type, as well as on the leaching conditions. Section 1 identifies the weak spots for each particular module type. Section 2, finally, concludes that the amount of leached out elements after 1.5 years in some cases exceeds the value after one day by more than two orders of magnitude. Thus, leaching experiments, which are just carried out over one day, are valuable. However, statements about the stability and environmental noxiousness of photovoltaic layers are highly questionable when based on such short-term measurements.

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2. Materials and Methods

2.1. Sample Preparation and Experimental Conditions

For cutting the module pieces with well-defined sizes and edges, we applied water jet cutting to get samples from the four major commercial PV technologies: crystalline silicon (c-Si), amorphous silicon (a-Si), cadmium telluride (CdTe), and copper indium gallium diselenide (CIGS). The module pieces are cut in a way that all module pieces contained at least one solder ribbon, but no parts of the frame, module boxes, or cables. The sample size of the module pieces for the leaching experiments was $5 \times 5 \text{ cm}^2$.

The leaching experiments were carried out under three different conditions, in order to identify potential accelerating conditions:

- Room temperature $T_{RT} = 25 \,^{\circ}\text{C}$, no agitation;
- Room temperature $T_{RT} = 25$ °C, with agitation (orbital shaking with rotational speed $n = 100 \,\mathrm{min}^{-1}$);
- Increased temperature $T_{IT} = 40$ °C, with agitation (orbital shaking with rotational speed $n = 100 \,\mathrm{min}^{-1}$).

For all experiments, we used high-density polyethylene (HDPE) bottles supplied with the leaching solution with a 1000 mL volume and two pieces from the very same module; see also [10]. The samples were not fixed in the bottles, and the bottles were lightproof. From earlier experiments (not presented here), we know that light accelerates leaching. However, light leads also to the production of alga, in particular for the long leaching times we are using. Alga production changes the experimental conditions and makes the leaching experiments less reproducible. Therefore, for the experiments presented here, we decided to use lightproof bottles. In order to increase the significance and validity of our experiments even more, each experiment was conducted in triplicate (this means three bottles, each one filled with two samples) for every condition. The leaching data, i.e., the concentration of a particular element in the solutions, are given as the mean value of the probes taken from the three bottles.

The leaching solutions with three different pHs covered the pH range of different environmental conditions that might occur in rain, groundwater, or waste disposal sites; their exact chemical composition and pH are shown in Table $^{\circ}$. All leaching solutions were base on deionized (DI) water. Over the whole 1.5 years of the experiments, the pH and the oxidation/reduction-potential E_H remained almost constant. Data for E_H , following DIN38404-6, stemmed from measurements with a platinum electrode against a silver/silver chloride reference (Ag/AgCl). The concentration of potassium chloride $c_{KCl}=3$ mol/L was $T=25\,^{\circ}\text{C}$; we converted the data to a potential against a standard hydrogen electrode $[\frac{1}{4}]$.

Throughout the leaching experiments, starting after 0.5 days, we periodically took 15 mL samples from the leaching solutions in the bottles and analyzed them for the leached out elements. After taking the probe, we pored in again fresh solution of 15 mL to keep the 1000 mL volume. All data were corrected for the amount of elements that were taken out from the solution due to sampling.

Table 1. Composition of leaching solutions with pH-values of 3, 7, and 11 used in the experiments and the measured reduction potential $E_{\rm H}$; the same conditions as in [40]. (Copyright (2017) The Japan Society of Applied Physics, reproduced with permission).

pН	<i>E</i> _H (V)	Chemical Composition
3	0.62	$15.4 \mathrm{g/L}\mathrm{C_6H_8O_7},$ $2.8 \mathrm{g/L}\mathrm{Na_2HPO_4},\mathrm{DI}\mathrm{water}$
7	0.56	$3.7 \text{ g/L KH}_2\text{PO}_4$, $5 \text{ g/L Na}_2\text{HPO}_4$, DI water
11	0.33	0.04 g/L NaOH, DI water

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2.2. Heavy Metal Analysis and Determination of Initial Metal Content in Module Pieces

We characterized the samples that were taken from the leaching solutions with inductively coupled plasma mass spectrometry (ICP-MS) and give the data for the leached elements according to ISO 17294-2 [10]. This method is only able to measure dissolved substances; it cannot detect precipitations in the solution. Therefore, the elements in the precipitates were not counted as leached.

Here, we always give the amount of leached out elements as a percentage with respect to the total amount of elements that were in the original module pieces. Therefore, we had to measure the total mass of those elements in the module pieces before the experiment. For that purpose, similar module pieces as those for the experiments were milled to a powder. Then, the powder was digested by adding acid and oxidizing agents and, finally, using microwave irradiation. After that, the digested samples underwent the ICP-MS analysis, similar to our earlier experiment [10]. For each PV technology, and for all the elements analyzed, Table 2 shows their mass M_{total} that was contained in the original reference module pieces.

Table 2. Elemental mass M_{total} in the 5×5 cm² module pieces for crystalline silicon (c-Si), amorphous silicon (a-Si), cadmium telluride (CdTe), and copper indium gallium diselenide (CIGS). The data represent mean values and the standard deviation from three measurements.

Element	c-Si (mg)	a-Si (mg)	CdTe (mg)	CIGS (mg)
Zn		0.9 ± 0.4		16.1 ± 3.1
Cd			13.9 ± 0.9	0.2 ± 0.002
Те			15.6 ± 1.1	
In				14.1 ± 4.3
Ga				0.7 ± 0.1
Se				6.7 ± 1.3
Al	167 ± 40	196 ± 27	289 ± 63	280 ± 190
Mo			12.7 ± 1.7	5.0 ± 0.2
Cu	254 ± 15	130 ± 14	80 ± 11	146 ± 5.7
Ni		1.0 ± 0.1		
Pb	16.7 ± 0.8		2.4 ± 0.3	

2.3. Mass Balancing at the End of the Leaching Experiments

During the leaching experiments, the total mass:

$$M_{total} = M_{diss} + M_{MP} + M_{FR} \tag{1}$$

of a particular element is the sum of the following masses: the amount M_{diss} dissolved in the solution, the remaining mass M_{MP} within the module pieces, and the mass M_{FR} that precipitated in the bottles of the solution. Clearly, at the end of the leaching experiment, the total mass, determined by Equation (1) should equal the masses in Table 1. We measured the mass M_{FR} in the following way: First, the module pieces were removed from the bottles, and then, the solution was filtered using vacuum filtration with a cellulose nitrate membrane filter with a pore size of $0.45~\mu m$. The mass M_{MP} was measured in the same way as the total mass of the elements in one module piece, as described previously. To measure the mass of the filter residue M_{FR} , we digested the filter residue together with the filter by applying a microwave enhanced oxidative digestion. Again, ICP-MS measured these samples, and the measurement of the cellulose nitrate membrane filter itself (blank value) ran in parallel. Subtracting the blank values for the filter, we calculated the amount of each element in the filter residue.

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3. Results

3.1. Delamination of Module Pieces

One focus during long-term leaching in water-based solutions lies in the occurrence of delamination. In order to simulate field conditions, in a first series of experiments, we did not use any accelerating leaching parameters for the module pieces for analyzing the delamination (Figure 1a). Delamination, in this study, is defined as a separation between all kinds of module layers, not only between the encapsulation layer, often ethylene vinyl acetate (EVA) foil, and the glass. The delamination was determined by visual examination.

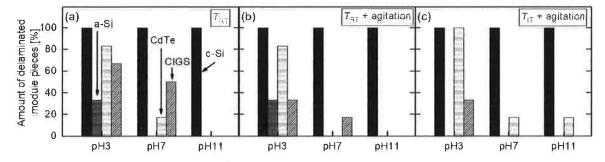


Figure 1. Amount of delaminated module pieces from crystalline silicon (c-Si), amorphous silicon (a-Si), cadmium telluride (CdTe), and copper indium gallium diselenide (CIGS) depending on the pH value of the water-based solution after 1.5 years for the three different experimental conditions: (a) $T_{RT} = 25$ °C, no agitation, (b) $T_{RT} = 25$ °C, with agitation, and (c) $T_{IT} = 40$ °C, with agitation.

After 1.5 years of leaching, we observed delamination in all kinds of PV module pieces: c-Si, a-Si, CdTe, and CIGS. The probability of delamination depends on the pH value of the solutions and the experimental conditions. In the case of c-Si module pieces, we always observed 100% delamination, independent of the pH-value, temperature, and agitation: in all aqueous solutions and for all module pieces, delamination occurred. However, in this case, delamination occurred via the EVA layer, and the type differed from the delamination type of thin film module pieces (via thin layers), as discussed later. Delamination of a-Si module pieces only happened in aqueous solutions with pH 3, and only 30% of the module pieces were affected. The agitation (Figure |b) and also the temperature (Figure |c) had no accelerating effect on the delamination. In fact, during the leaching experiments with $T_{IT}=40\,^{\circ}\mathrm{C}$ plus agitation, no delamination of a-Si module pieces was found. The highest amount of delamination in the case of CdTe module pieces occurred in acidic water-based solutions. For this type of module, the increased temperature weakly affected the delamination, as shown in Figure 1c. At room temperature, no delaminated CdTe module pieces were observed in the solutions with pH 11, whereas in neutral solutions, only 17% of the module pieces showed delamination. The pH dependence held also for the CIGS module pieces. In pH 3 solutions, the highest amount of delamination occurred with 67% of the module pieces. In pH 7 solutions, the amount of delaminated module pieces was still 50%. In alkaline solutions with pH 11, no delamination was observed with agitation or with increased temperature.

We classified all these delaminations into three different types: (i) Total separation: Here, the front side is clearly separated from the rear side. This delamination occurs in case of CdTe and a-Si module pieces. Figure _a shows a scheme of this delamination type. (ii) Fractional separation: Here, only parts of the rear or front side are separated. The major part of the module compound is still intact. This type of delamination takes place for CIGS module pieces and for c-Si module pieces when leached in solutions with pH 11. The scheme is shown in Figure _b. (iii) Blistering: Figure _c shows this third type of delamination. Blistering occurs between either the front glass and the EVA foil, or between the EVA foil and the solar cell, but there is no complete separation. This type only occurs in c-Si module pieces.

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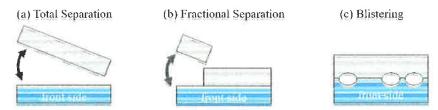


Figure 2. Different types of delamination during the leaching process: (a) Total separation (observed for CdTe and a-Si module pieces). The front side is completely separated from the rear side. (b) Fractional separation (observed for CIGS and c-Si module pieces). Only small parts of the rear side are separated; the major part of the module structure is still intact. (c) Blistering (only observed for c-Si module pieces). Bubble formation emerges locally on the front side of c-Si module pieces, either between glass and EVA or between EVA and solar cell depending on the pH. In this case, no separation occurs between the front and the rear side.

Total separation: Figure _a-d shows photographs of the front and the rear side of a 5×5 cm² CdTe module piece before and after 1.5 years of leaching. Before leaching the CdTe module piece, the integrated series connection of the cells is visible (see the horizontal lines) on the front side (Figure _a) and also on the rear side (Figure _b). On the rear side, one sees also the solder ribbon. Only the rear side glass of the module piece shows cracks caused by the water jet cutting. The breakage pattern of this glass indicates that heat-strengthened glass is used as the rear side glass. Figure _c,d shows the front and the rear side of a CdTe module piece after the leaching process of 1.5 years in solutions with pH 3. Apart from a few parts, the module material disappeared completely. The solder ribbon is still attached to the rear side glass by an insulating tape. After this long-term leaching, the front and the rear side glasses are no longer connected to each other, but totally separated. For a-Si module pieces, the same type of delamination is observed.

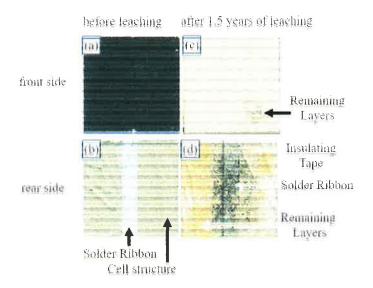


Figure 3. Photographs of (a) the front and (b) the rear side of a 5×5 cm² CdTe module piece before leaching. On the rear side, the solder ribbon and the interconnection of cells are visible. (c) Front side of the module piece after leaching over 1.5 years in solutions with pH 3. Apart from a few visible remaining parts, the module material disappeared. (d) Rear side of the module piece after the leaching. The solder ribbon with the insulating tape is visible and also some parts of remaining layers. After 1.5 years of leaching, the front and the rear side glasses are no longer attached to each other; total separation occurs.

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Fractional separation: Figure _a-d shows photographs of the front and the rear side of a 5×5 cm² CIGS module piece before and after 1.5 years of leaching: parts of the rear side are separated. Both glasses, the front and the rear side glass, show cracks due to the water jet cutting. Figure 4c shows a photograph of the front side after 1.5 years of leaching in solutions with pH 3. From the front side, a few transparent spots around the edges are visible. From a more detailed look at the back side of the module piece (Figure 4d), it becomes clear that at the transparent spots, parts of the rear side glass are missing, together with the back contact and the active module layers. Therefore, only the transparent front glass remains.

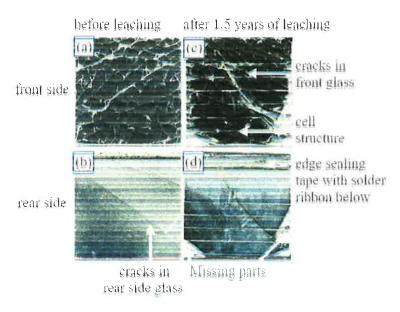


Figure 4. Photographs of (a) the front and (b) the rear side of a 5×5 cm² CIGS module piece before leaching. On the rear side, the edge sealing tape with the solder ribbon below is visible. In the front glass, as well as in the rear side glass, cracks are recognizable; they stem from the water jet cutting. (c) Front side after leaching for 1.5 years in pH 3 solution. (d) Rear side after leaching. Parts of the rear glass are missing, together with the back contact and the active layers. Only the transparent front glass remains.

Blistering: Figure _a shows a photograph of a c-Si module piece of $5 \times 5 \, \mathrm{cm}^2$ in size after 1.5 years of leaching in pH 3 solution. In this case, local bubble formation takes place between the solar cell and the EVA foil, especially around the solder ribbon, but no total separation is observed. In solutions with pH 11, delamination between the EVA foil and the front glass appears across extended areas (Figure _b). A few parts of the glass are separated, and the exposed EVA foil with the solar cell below remains. Due to delamination, the textured structure of the front glass becomes visible. The breakage pattern of the glass matches the pattern known for tempered glass. The rear side of the c-Si module pieces (white backsheet) shows no changes caused by leaching. Only for this PV technology, the occurrence of delamination, i.e., blistering, does not depend on the pH value of the leaching solution. Module pieces leached in pH 7 solutions also show blistering. Blistering takes place at both locations: between the solar cell and the EVA foil, as well as between the EVA foil and the front glass.

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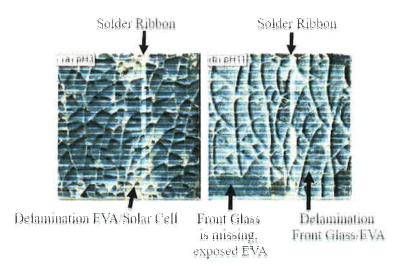


Figure 5. Photographs of c-Si module pieces with 5×5 cm² after 1.5 years of leaching in solutions with (a) pH 3 and (b) pH 11. In solutions with pH 3, a local bubble formation occurs between the solar cell and the EVA foil, preferably around the solder ribbon. In solutions with pH 11, a delamination between the EVA foil and the front glass appears across extended areas. A few parts of the glass are separated, and the exposed EVA foil with the solar cell below remains.

3.2. Leaching Results

The previous figures, as well as our previous experiments on milled module pieces [$_{\rm c}$] give the proof for severe leaching for all module technologies. In the following, we present detailed results on the elements that were leached out from module pieces of 5×5 cm² in size. In a first publication [$_{\rm c}$], we presented preliminary leaching data for Cd, Te, and Pb only and until Day 360, i.e., about one year. In contrast, here, we extend our study to 1.5 years and include many more other elements. This gives us the chance to identify possible weak spots and the leaching paths in the modules. In detail, we measure the amount of the following elements in our water-based solutions of Table $^{+}$ with different pH-values: Zn, Te, In, Ga, Se, Al, Mo, Cu, Cd, and Pb. The non-toxic element Si, which is contained in the modules' cells from crystalline, as well as from amorphous silicon, is not measured, simply because the module glass itself also contains high amounts of Si. Our measurement conducted by ICP-MS cannot distinguish between Si from the cells and from the glass of the modules.

3.2.1. CdTe Module Pieces

Figure a shows the common structure of a CdTe module including the front glass and front contact (usually tin oxide (SnO₂)), the buffer layer cadmium sulfide (CdS), the photoactive layer CdTe, the Mo back contact, the encapsulant EVA, and finally, the rear side glass. The typical thickness of each layer is also given [[------]]. CdTe modules are mostly fabricated in a superstrate configuration: the production process starts with the front glass, on which the transparent front contact SnO₂ is deposited. We used commercial CdTe-modules for the preparation of the module pieces and measured the amount of eluted elements with the above discussed ICP-MS method. Therefore, we are not able to distinguish between the Cd from the CdS buffer layer and the Cd from the photoactive CdTe film.

Figure 6b–d shows the time-dependent leaching of the elements Cd, Te, and Mo in water-based solutions with pH 3, pH 7, and pH 11; see also [10] for the leaching results of Cd and Te until Day 360. These results stemmed from experiments at $T_{RT}=25\,^{\circ}\text{C}$ without agitation. In all solutions, the amount of leached elements increases with time, but with different leaching rates for different pHs of the solutions. At the early beginning of leaching, Mo from the back contact leaches out with the highest amount, followed by Cd.

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The leaching results in Figure b-d clearly demonstrate an enormous difference between the leaching concentrations after one day and after the 1.5 years. For example, the Cd-elution in pH 3 at the end of the experiment reaches almost 100%, whereas it is only about 1 % after one day. For pH 3 and pH 7, the eluted concentrations increase approximately linearly with time: a one order of magnitude increase (on the log-scale) of the time leads to a one order of magnitude higher concentration (on the log scale) of the concentration. For pH 11, the data approach a square root dependence with time: it needs a two orders of magnitude increase on the time scale for a one order of magnitude increase on the concentration scale.

Figure 7 shows the ratio $R_{Cd:Te}$ of dissolved Cd to dissolved Te from leaching CdTe module pieces in solutions with pH 3, pH 7, and pH 11. For leaching solutions with pH 3, the value of $R_{Cd:Te}$ is not constant over the leaching time. At the beginning of leaching, $R_{Cd:Te}$ is highest with 35:1, but with time, it approaches $R_{Cd:Te} \approx 1$. For neutral solutions with pH 7, $R_{Cd:Te} \approx 1$ and is almost constant over time. The same behavior applies for leaching in alkaline solutions, but with $R_{Cd:Te} \approx 0.1$. This means that more Te is dissolved in the solutions.

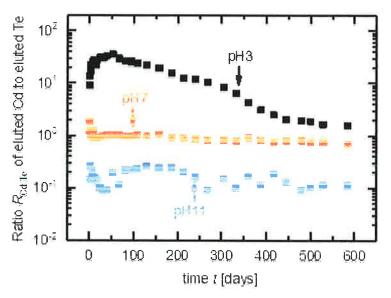


Figure 7. Ratio $R_{Cd:Te}$ of dissolved Cd to dissolved Te from leaching CdTe module pieces in solutions with pH 3, pH 7, and pH 11.

3.2.2. CIGS Module Pieces

Figure %a shows a schematic cross-section through a CIGS module, composed of the front glass with EVA, the front contact (usually consisting of aluminum-doped zinc oxide, ZnO:Al), a buffer layer of CdS, the absorber layer Cu(In, Ga)Se2, and a thin interfacial layer of MoSe2 between the substrate glass and the CIGS. The MoSe2 is formed by a reaction between the Mo and the Se atmosphere during the deposition of the Cu, In, and Ga [22]. CIGS modules are built in a substrate configuration. The fabrication starts with the deposition (sputtering or evaporation) of Mo on the rear glass. Then, the CIGS is deposited, mostly by co-sputtering or thermal evaporation of the constituent elements, Cu, In, and Ga in a Se atmosphere.

Figure _b shows the leaching data for Zn, Cd, Mo, Cu, Ga, and In in pH 3 solutions. At the beginning of leaching, Zn from the front contact shows the highest amount with $c_{Zn} \approx 1\%$ already after one day; finally, we observe $c_{Zn} \approx 62\%$ after 1.5 years. Furthermore, already after one day, certain amounts of Mo from the back contact and In from the absorber layer are measurable in the solutions. Other elements, like Cd, Cu, and Ga, are detected later on. The leaching rates of each element differ in absolute values, but show a similar

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time dependence. The leaching of the Mo from the CIGS module pieces differs from the data for Mo from CdTe module pieces (see Figure 6b). The Mo from CdTe module pieces seems to be more soluble, in particular for acidic solutions. The difference probably results from the formation of MoSe₂ at the back side of the CIGS films.

Figure 3c shows the leaching of Zn, Cd, Mo, Cu, Ga, and Se in pH 7 solutions. Indium is not detected in the solution with pH 7. The leaching of Zn for this pH is lower than that for pH 3, and so is the concentration after 1.5 years. In solutions with pH 11, we only find Mo, Ga, and Se with low concentrations in the solutions, as shown in Figure 3d. The leached Mo is lowest for pH 11 compared to the data from solutions with pH 3 and pH 7. In the case of CIGS module pieces, comparable to CdTe, the Mo back contact is a weak spot, but also the front contact Zn and the buffer layer Cd.

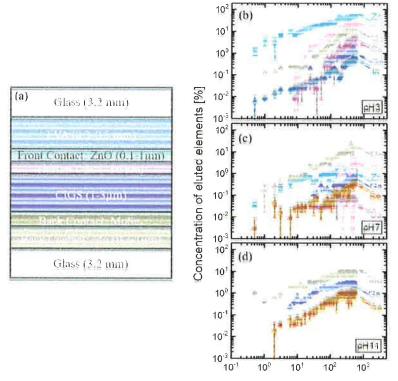


Figure 8. (a) Schematic structure of a typical CIGS module (not drawn to scale) and (b) time-dependent leaching results of the elements Zn, Cd, Mo, Cu, Ga, and In from CIGS module pieces in acidic aqueous solutions with pH 3 and (c) in solutions with pH 7 and (d) pH 11. In leaching solutions with pH 11, the concentrations of the elements Cd, Zn, Cu, and In are below the detection limit.

3.2.3. c-Si Module Pieces

Figure a shows a schematic cross-section through a classic c-Si module, consisting of a front glass with EVA, a silver front contact grid with contact fingers and busbars, and the silicon solar cell with a screen printed aluminum back contact and screen printed Ag contact pads (not drawn in the scheme). In contrast to thin film modules, instead of a rear glass, most c-Si modules have a backsheet and a second EVA sheet at the rear side. Figure ob,c shows the leaching data for Al and Pb for pH 3 and pH 11 (see also [iii] for the leaching results of Pb until Day 360). In the case of pH 7, the concentrations of Al and Pb are below the detection limit, which is 500 $\mu g/L$ for Al and 20 $\mu g/L$ for Pb. The eluted Pb stems either from the solder ribbon, which is not shown in the schematic cross-section, or from the screen printed metallization. For pH 3, the amount of leached Pb remains constant and below 0.1% until Day 241. After this time, the concentration increases dramatically up to $c_{Pb} \approx 3.7\%$ after 1.5 years. The concentration of Al reaches $c_{Al} \approx 27\%$ after 1.5 years in

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the acidic solution. In contrast, for the alkaline solution with pH 11, the concentrations of Al and Pb are significantly lower, as shown in Figure 9c. In both cases, the leaching rates of Al are orders of magnitude higher than the ones for Pb. Thus, in the case of c-Si module pieces, the Al contact, which is screen printed and fired into the back side, makes up the weak spot and opens the path for leaching.

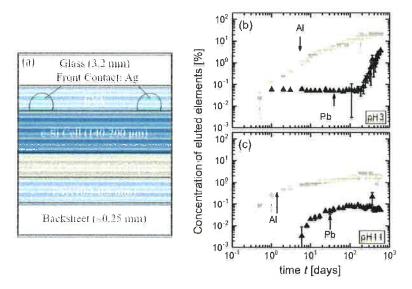


Figure 9. (a) Schematic structure of a typical c-Si module (not drawn to scale) and (b) time-dependent leaching results of Al and Pb from c-Si module pieces in acidic aqueous solutions with pH 3 and (c) in solutions with pH 11. In leaching solutions with pH 7, the concentrations of Al and Pb are below the detection limit.

3.2.4. a-Si Module Pieces

The common structure of an a-Si module is shown in Figure wa. Amorphous silicon modules typically consist of a front glass with the front contact layer (SnO₂ is mostly used), the photoactive p-i-n layer from a-Si, followed by an intermediate layer consisting of ZnO and Ag, the back contact with a combination of Ni and Cu, and the encapsulant with the rear glass [25]. Similar to the production of CdTe modules, a-Si modules are built in a superstrate configuration, starting with the deposition of the front contact directly on the front glass. Figure 1. b,c shows the concentrations of eluted Zn, Cu, and Ni in the solutions with pH 3 and pH 7. Unfortunately, we do not have any data about Ni before Day 388 of leaching. In leaching solutions with pH 11, the concentrations of Zn, Cu, and Ni are below the detection limits. For the other pH-values, we are able to present data: Zn, which stems from the intermediate layer, shows strong leaching with concentrations up to $c_{Zn}\approx 90\%$ after 1.5 years of leaching in the acidic pH 3 solution. The concentration of eluted Ni lies in the same range, whereas the concentration of Cu is $c_{Cu} \approx 7.5\%$. In aqueous solutions with pH 7, the elements Zn, Ni, and Cu leach only in minor amounts. The elements Zn, Cu, and Ni are leached out linearly with time, but with different rates depending on the element itself, as well as on the pH of the solution. In all cases, the leaching of the Zn is highest, and therefore, we identify the ZnO layer as a weak spot in a-Si module pieces.

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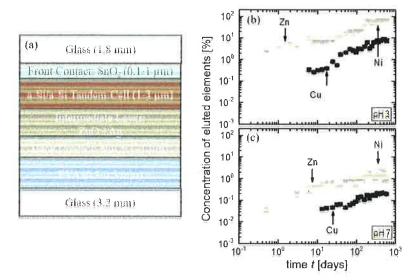


Figure 10. (a) Schematic structure of a typical a-Si module (not drawn to scale) and (b) time-dependent leaching results of Zn, Cu, and Ni from a-Si module pieces in acidic aqueous solutions with pH 3 and (c) in solutions with pH 7. In leaching solutions with pH 11, the concentrations of Zn, Cu, and Ni are not measurable according to the detection limit.

3.3. Accelerating Leaching Parameters for Cd from CdTe Module Pieces

All of the experiments considered so far were performed without any acceleration, for example, by elevated temperatures or stirring/agitation. Figure 112a,b compares the data for Cd, leached out from CdTe module pieces, for the three different pH-values and with/without agitation. Apart from the tests at $T_{RT}=25\,^{\circ}\text{C}$, we also used additional agitation and solutions at an elevated temperature $T_{IT}=40\,^{\circ}\text{C}$. All test series ran in parallel. Figure 11 a shows the results after t = 1 day and Figure 11 b after t = 416 days. The comparison of the two figures again underlines the dramatic difference in the leaching results after one day and after more than a year. Therefore, standard leaching experiments, which are only carried out over one day, are more or less meaningless, when one aims at judging the toxicity of CdTe modules. Furthermore, after just one day (see Figure 22a), additional agitation and/or elevated temperatures only slightly increase the amount of eluted Cd, even if for pH 3 solutions. In contrast, in particular for pH 7, increasing the temperature from $T_{RT}=25\,^{\circ}\text{C}$ to $T_{RI}=40\,^{\circ}\text{C}$ results in five times stronger leaching. Leaching in pH 11 solution triples the leaching of Cd for the same temperature increase. In contrast, in the case of agitation, we are not able to detect any Cd in the alkaline solutions after one day. In the case of pH 3, for all experimental conditions, after t = 416 days, the amount of eluted Cd in acidic solutions reaches almost 100%. In the case of the neutral pH 7 solutions, the final data all lie in the same range of $2\% < c_{Cd} < 4\%$. After 416 days, the eluted Cd reaches saturated values. Therefore, as shown in Figure 11b, there is almost no or only minor differences between the data with and without additional accelerating parameters.

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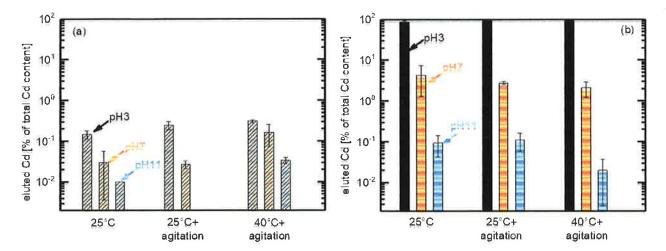


Figure 11. Dramatic difference between the leaching data after one day and more than a year of Cd out of CdTe module pieces. (a) Amount of eluted Cd from CdTe module pieces after t=1 day in solutions of pH 3, 7, and 11 and different leaching conditions: with/without agitation and increased temperature $T_{IT}=40\,^{\circ}\text{C}$ plus agitation. For all conditions, after one day, the Cd concentration ranges below 1%. (b) Amount of eluted Cd from CdTe module pieces after t=416 days. For pH 3, almost 100% of the Cd is leached out. For pH 7, still several percent are leached out. This finding raises the question of the meaningfulness of judging the toxicity of CdTe containing modules with tests that are carried out for one day only.

3.4. Analysis of Time Dependence

To get a better understanding of how the different leaching conditions affect the time-dependent leaching, we fit the measured concentration C(t) at the time t to an exponential model according to:

$$C(t) = C_{max}(1 - e^{-\frac{t}{\tau}}),$$
 (2)

where C_{max} is the maximum, final concentration dissolved in the solution and τ is the leaching time constant. The leaching time constant represents the time for the concentration to reach 63% of its final value as a measure of leaching velocity. For times $t \ll \tau$, the Taylor expansion of Equation (?) yields a linear behavior according to:

$$C(t) = C_{max} \frac{t}{\tau}. (3)$$

Indeed, in almost all of our experiments, if not disturbed by delamination effects, we see the linear time dependence predicted by Equation (a) and the saturation predicted by Equation (b). Equation (c) is the direct consequence of the number of atoms (Cd) that are leached per unit time, being directly proportional to the number of atoms that are still available for etching. Such an approach always leads to an exponential function such as Equation (c). However, not only delamination (which is expected to accelerate the leaching), but also other effects such as the formation of surface layers (see our work [24]), diffusion limitations, and/or the formation of precipitates could result in deviations from a behavior following Equations (2) and (3). For a diffusion limited leaching on a thin layer, one would observe a square root dependence, as discussed in [24]. This might be the case for some of the data here, in particular for pH 11.

Most of experimental data, in particular for pH 3 and pH 7, show an excellent agreement with the linear behavior, predicted by Equation () for time $t \ll \tau$, as well as for the saturation behavior, Equation (). As an example, Figure 12a–c shows the time-dependent leaching of Cd from CdTe module pieces in solutions with pH 3 for the three different leaching conditions. The data are excellently fit with coefficients of determination $R^2 \geq 0.96$. Figure 12d–f shows the leaching data of Cd in solutions with pH 7. The dotted lines

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represent the calculated fit according to Equation (). The dashed lines show the calculated maximum Cd concentration C_{max} in the solutions; the time constants τ are also given. Modifications to the leaching conditions lead to accelerated leaching with a shorter time constant τ : For example, increasing the temperature to $T_{IT}=40\,^{\circ}\text{C}$, as shown in Figure 12c, leads to a time constant that is only a third of the value at $T_{RT}=25\,^{\circ}\text{C}$. In contrast to the time constant, the C_{max} -value is almost independent of the leaching conditions in pH 3 solution; it holds $C_{max}\approx 100\%$. Figure 1.2d shows the leaching data for pH 7 at $T_{RT}=25\,^{\circ}\text{C}$ without agitation; we find $\tau=210$ days. After this time $t=\tau$, a value of 63% of the maximum Cd concentration is reached, which is estimated to be $C_{max}=4.8\%$. Modified experiments slightly decrease the maximum concentration, which we explain by the large standard deviations at the end of leaching, caused by the delamination of module pieces. Additional agitation decreases the time constant to $\tau=80$ days (Figure 12e); increased temperature yields $\tau=20$ days (Figure 15), i.e., four-times faster leaching.

The excellent fits of our leaching data for pH 3 and pH 7 to Equations ($^{\circ}$) and ($^{\circ}$) show also that in this case, the leaching is not limited by any diffusion processes, which might take place inside or on the surface of the CdTe layers (this statement holds also for the experiments on all other cell technologies). This behavior is in contrast to our results on the leaching of milled module pieces, which were reported in a separate publication [$^{\circ}$ 4]. There, the model for the small spherical CdTe particles, with sizes below one millimeter, predicts a power law, with leaching data following a dependence on time t according to $t^{0.43}$. Indeed, in [$^{\circ}$ 4] we observed this behavior for the small particles also experimentally. Due to the different size and geometry of the samples, the leaching from the flat plates of module pieces as presented here, at least for pH 3 and pH 7, follows a different time dependence, which, for short times compared to the leaching time constant, is $t^{1.0}$, as, for example, shown in Figure $^{\circ}$ 6,c.

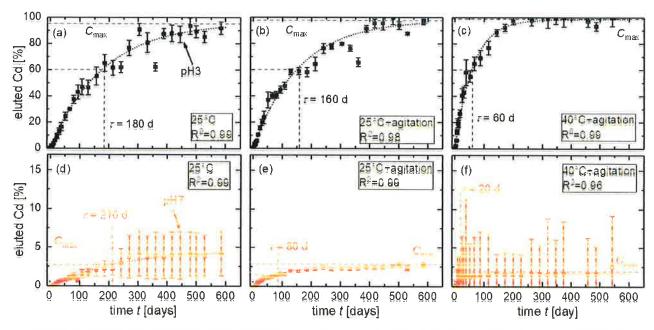


Figure 12. Leaching of Cd from CdTe module pieces in solutions with pH 3 at (a) $T_{RT} = 25$ °C, (b) at $T_{RT} = 25$ °C with agitation, and (c) at $T_{IT} = 40$ °C with agitation. Eluted Cd in solutions with pH 7 at (d) $T_{RT} = 25$ °C, (e) at $T_{RT} = 25$ °C with agitation, and (f) at $T_{IT} = 40$ °C with agitation. The dotted lines represent the calculated fit according to Equation (_) with high coefficients of determination R^2 . The dashed lines show the calculated maximum concentration C_{max} in the solutions.

Figure 1.5 a shows the leaching time constant τ for pH 3 and pH 7: A higher temperature results in faster leaching. In our study, $T_{IT}=40\,^{\circ}\text{C}$ is used, which is a common temperature PV modules reach when exposed to sunlight; on hot summer days, the temperatures are

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even higher. In solutions with pH 7, the change in the leaching time constant due to varied conditions is even stronger. In contrast to a different τ , Figure 10b shows that the maximum concentration C_{max} of eluted Cd remains nearly constant and independent of modifications to the leaching conditions. However, the value C_{max} highly depends on the pH of the leaching solution: it holds $C_{max} \approx 100\%$ for pH 3 and $C_{max} \leq 4.8\%$ for pH 7. The lower C_{max} for pH 7 is explained by the formation of cadmium hydroxide in neutral solutions. This compound is not soluble and therefore not detected by our measurement method ICP-MS.

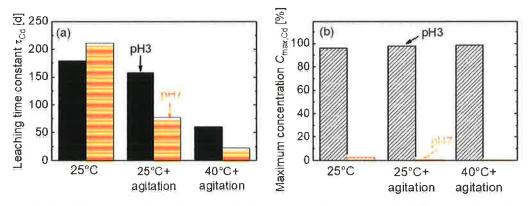


Figure 13. Calculated fit parameters for the leaching of Cd from CdTe module pieces under different conditions. (a) Leaching time constant τ_{Cd} for solutions with pH 3 and pH 7. (b) Maximum concentration C_{max} for the same conditions as in (a).

3.5. Mass Balance for CdTe Module Pieces

Figure 1.4 shows the distribution of the mass fractions for the elements Cd, Te, and Mo from CdTe module pieces leached for 700 days at $T_{RT}=25\,^{\circ}\text{C}$ without agitation: the dissolved amount in the solution M_{diss} , the remaining mass in the module piece M_{MP} after the leaching process, and the mass of the filter residue M_{FR} with particles bigger than 0.45 mm. There are strong differences between the leaching behavior for pH 3 and pH 11:

pH 3: Almost all Cd, Te, and Mo from the module pieces is found in the mass M_{diss} of dissolved elements. In particular, for Cd, almost nothing remains in the module piece (mass M_{MP}) or is found in the mass M_{FR} of precipitates.

pH 11: Almost all Cd and Te still remain in the module pieces and are represented by the mass M_{MP} . Only in the case of Mo, a part of the Mo is measured in the solution as M_{diss} .

Mass loss for Te and Mo: The sum of the masses in the solution, filter, and module pieces measured after the leaching should reach 100% of the value before the leaching. However, for Te and Mo, the sum of the measured values after leaching is below 100%. The relatively small amount of missing mass is termed M_{Rest} in Figure 14. We explain the difference by the milling process for the determination of the remaining mass M_{MP} in the module piece. For a few samples, the milling process did not completely crush the encapsulation. The Mo back contact has a strong adhesion to the encapsulant. Therefore, it seems possible that not all Mo material was digested. There might also be a material loss during the filtration process, either when drying the filter afterwards, or due to particles remaining in the HDPE bottles despite carefully repeated rinsing.

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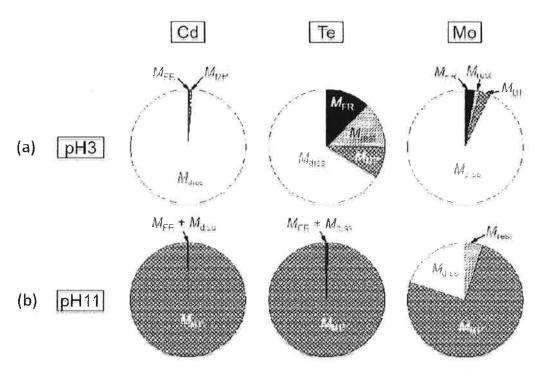


Figure 14. Mass balance of the CdTe module piece after 700 days in leaching solutions with (a) pH 3 and (b) pH 11 at $T_{RT} = 25$ °C without agitation. In solutions with pH 3, the largest fraction of Cd, Te, and Mo is dissolved and found as M_{diss} ; only a small fraction M_{MP} remains in the module pieces. No Cd-particles (mass M_{FR}) are measured within the filter residue, whereas for Te and Mo, a small part is found in the residue. In solutions with pH 11, the major part of the elements Cd and Te remains in the module piece and is not leached out. Molybdenum is also measured in the solution.

4. Discussion

The combination of leaching experiments and the observation of delamination yields the following major insight: In the case of thin film modules (CdTe, CIGS, and a-Si), the delamination is the consequence of the high solubility of one or more thin layers of the modules' cells. They form a path for the attack of the water-based solutions. In contrast, in the case of modules containing cells from crystalline silicon, the cell's Al back contact is highly soluble, but not responsible for delamination. Instead, blistering occurs: delamination of c-Si modules is not visible on the back side, but on the front side, either between the front glass and EVA or between the EVA and the Si cell, depending on the pH of the leaching solution. Delamination between the front EVA and solar cell preferentially occurs around the solder ribbon on the front side of the cell and is therefore correlated with the leaching of Pb out of the solder ribbon. The backsheet on the rear side of the c-Si module piece shows no changes after the leaching. Unfortunately, the backsheet is not transparent; therefore, we do not have information about the condition of the solder ribbon on the back side and how the leaching of the Al back contact affects the leaching of the solder ribbon on the back. In solutions with pH 3, a local delamination takes place between the solar cell and the EVA foil, whereas in pH 11 solutions, the delamination occurs between front glass and EVA. In pH 7 solutions, we observe both kinds of delamination. The solution probably attacks the coupling agent. Therefore, in this case, we assume adhesion problems to be the main reason for blistering.

In the case of CdTe module pieces, the photoactive CdTe, as well as the Mo back contact are highly soluble in acidic, aqueous solutions with pH 3. The severe leaching correlates with the frequent total separation, i.e., delamination of the module pieces. For this type of module and under acidic conditions, frequently, the front side is clearly separated from the rear. As a consequence, this delamination enhances the leaching, especially of Te, which is

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observed in all leaching solutions, independent of pH. For short times, leaching for Cd, Te, and Mo increases linearly with time, but at different rates; the rates depend on the pH. The ratio $R_{Cd:Te}$ of eluted Cd to eluted Te Cd:Te also depends on the pH. This behavior is in accordance with the Pourbaix (potential-pH) diagram for CdTe in aqueous solutions showing the possible species of Cd and Te depending on the pH and the redox potential E_H [φ]. In solutions with pH 3, the Te species have a lower solubility compared to the Cd species, which are present as Cd²⁺ ions. The solubility of predominant species of Cd and Te for pH 7 is the same, which explains the ratio $R_{Cd:Te} = 1$. In solutions with pH 11, probably, Te species form with a solubility that exceeds that of Cd. This assumption explains the estimated $R_{Cd:Te} \approx 0.1$. It is notable that only in solutions with pH 3, the ratio $R_{Cd:Te}$ is strongly time dependent, whereas it is almost constant for solutions with pH 7 and pH 11.

Increasing the temperature results in accelerated leaching of Cd from CdTe module pieces. The same behavior was earlier reported by Collins and Anctil [25] for the leaching of Cd from CIGS modules and Pb from c-Si modules, by increasing the leaching temperature to $T=50\,^{\circ}\text{C}$. All of our leaching data for Cd are well described by Equation (?) and the C_{max} -value for Cd, which decreases with increasing pH. This finding is in accordance with the data reported by Ramos-Ruiz [7] on leaching of Cd and Te out of CdTe modules in solutions with different pH values under simulated landfill conditions. This pH-dependent leaching is understood on the basis of known leaching patterns, not only for Cd, but for all measured elements in this study.

In contrast to CdTe modules, with total delamination, for CIGS module pieces, fractional separation occurs in solutions with pH 3, as well as with pH 7: only parts of the rear side are separated. Our leaching experiments point out all CIGS module layers to be more or less soluble in aqueous solutions. The highest solubility is found for Zn from the front contact in pH 3 solutions, and at this location, we observe the fractional separation. With the Zn eluted, there is no longer a stable bond between the front glass/EVA and the rear side consisting of the photoactive layers (CdS, CIGS) and the back contact on top of the rear glass.

The leaching concentrations of Cd out of CIGS module pieces are lower than from CdTe module pieces. This lower leaching of Cd indicates that CdS in the CIGS cells is more stable against the solutions than CdTe. The Mo back contact of CIGS module pieces also seems to be more stable than the Mo back contact of CdTe module pieces. Between these two module types, the amounts of leached Mo differ especially in solutions with pH 3 and pH 11: in these solutions, Mo from CIGS shows lower leaching than Mo from CdTe module pieces. This difference probably arises from the formation of the MoSe₂ layer during the deposition of the CIGS layer in module fabrication. Theelen et al. [$_{2\cdot 0}$] proposed that MoSe₂ prevents the formation of molybdenum oxide, MoO_x, which is the main reason for the degradation of Mo when it comes in contact with water or moisture. Modules from CdTe do not contain a protecting MoSe₂ layer. Therefore, during leaching, MoO_x is probably formed. The formation of MoO_x results in a large volume expansion [$_{2\cdot 0}$]. This could explain the observed delaminations for CdTe module pieces.

Amorphous silicon module pieces show also highly time-dependent leaching, in particular the front layer of ZnO in combination with the Ni/Cu back contact. After 1.5 years of leaching, the elements Zn and Ni reach almost 100% in solutions with pH 3. The time-dependent leaching behavior of Zn from a-Si module pieces is similar to the leaching behavior of Zn from CIGS module pieces in both solutions of pH 3 and pH 7. The leaching rates are also comparable. Therefore, in the case of a-Si modules, ZnO is a weak spot. This finding is in line with the experiments of Pern et al. [...]: These authors studied the stability of various transparent conducting oxides (TCO), including ZnO. In their experiments, ZnO showed the highest degradation rates (of all studied TCOs) when it comes in contact with moisture.

5. Conclusions

Our leaching experiments on PV modules pieces from CdTe, CIGS, c-Si, and a-Si in water-based solutions with pH 3, pH 7, and pH 11 simulate different environmental conditions. Due to the wide span of pH-values, it seems also possible to predict from our experiments the behavior for other pH-values. During the leaching over 1.5 years, we observe different types of delamination. In the case of thin film modules (CdTe, CIGS, a-Si), the thin film layers themselves or the contact materials (e.g., Mo, ZnO) are the weak spots. Finally, their leaching leads to delamination. In contrast, in the case of modules with c-Si, the Al back contact shows the strongest leaching. However, this leaching is not responsible for the delamination. Instead, problems with the EVA causes blistering, which leads to the delamination of the module pieces with c-Si.

The time-dependent leaching is well described by an exponential saturation behavior with a leaching time constant, at least for low pH-values. The leaching time constant differs from element-to-element and changes under agitation and/or a temperature increase. For times small compared to this time constant, the amount of leached out elements increases linearly with time. It is therefore understandable that, roughly speaking, the concentrations of many leached out elements after 500 days are also more than two orders of magnitude higher than after one day. However, we observe also ratios of the concentrations after one 500 days and after one day that are higher or lower than two orders of magnitude: Higher values are obtained, when delamination occurs during leaching. Lower values are obtained when, for example, the ratio of eluted to precipitating elements changes during the experiment.

In the case of Cd leaching from CdTe module pieces, increased temperature leads to substantially accelerated leaching. In contrast, the maximal concentration of leached Cd only depends on the pH of the solution. A mass balance method shows that Cd, which is not measured in the solutions as dissolved, remains in the module pieces themselves and is not, as expected, leached out and then precipitated in the solutions.

In any case and under all experimental conditions, it is possible to either leach out all or a substantial amount of most elements from the module pieces. Clearly, in the case of our module pieces, leaching starts from the unprotected edges of the pieces of $5 \times 5 \text{ cm}^2$ in size, cut out from large area modules. During the manufacturing of commercial modules, they are provided with an edge sealing, which should prevent any leaching under normal operating conditions of the (undamaged) modules. However, if the edge sealing of the modules is not carefully done, or if it is damaged, or even worse, if the (front) module glass is broken, leaching is unavoidable. Rain water with pH values always below pH 7 will suffice to leach out the (toxic) elements. Even worse, if modules are cracked, crushed, or even milled and end up in landfills, the module constituents will also be leached out. Therefore, if toxic materials are not completely avoided in photovoltaic modules, it is of utmost importance to (i) replace damaged modules as fast as possible and to (ii) recollect and recycle them completely. In all other cases, in view of the huge amount of installed PV modules, most of them still containing Pb (mostly in the solder of the cell connectors) and/or Cd, they may impose a severe danger to the environment.

Compared to other, earlier studies, our experiments were carried out over more than a year. As one of the key results, we found huge differences between the amount of elements found in the solutions after one day and more than a year. In our opinion, tests for just one day are inappropriate to judge module technologies, in particular if conclusions and political decisions on the toxicity and environmental issues of photovoltaic module technologies are based on such short-term measurements.

Author Contributions: Conceptualization amd project administration, R.Z.-G. and J.H.W.; methodology, R.Z.-G., M.K., J.N.; validation and investigation, J.N., R.Z.-G., M.K., C.F.; analysis, writing, editing, and reviewing J.N., R.Z.-G., M.K., J.H.W. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest: The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; nor in the decision to publish the results.

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Tellurium leaches the least. Thus, already from this observation, it becomes clear that the Mo layer is a weak spot in the case of the CdTe module. After approximately 300 days of leaching, the concentration of Te increases dramatically and approaches the eluted amount of Cd and Mo. Around this time of leaching, delaminations are observed. After 1.5 years, the concentrations of eluted Cd and Mo related to the total amount in the module piece in acidic solutions (pH 3) reach $c_{Cd} \approx 92\%$ and $c_{Mo} \approx 88\%$. The amount of eluted Te is $c_{Te} \approx 54\%$.

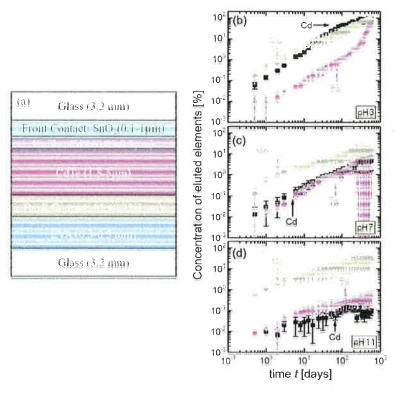


Figure 6. (a) Schematic structure of a typical CdTe module (not drawn to scale) and (b) time-dependent leaching results of the elements Cd, Te, and Mo from CdTe module pieces in acidic aqueous solutions with pH 3 and (c) in solutions with pH 7 and (d) pH 11.

Figure oc shows the leaching in water-based solutions with pH 7. Here, the concentrations of eluted Cd, Mo, and Te, finally, after 1.5 years, reach $c_{Cd}\approx 4.5\%$, $c_{Mo}\approx 19\%$, and $c_{Te}\approx 7.8\%$, respectively. In this case, the leaching of Cd and Te shows the same time-dependent leaching behavior. The large standard deviations for Te appearing after approximately 300 days of leaching are due to the delamination of one module piece out of three experimental runs. Clearly, after delamination of this particular module piece, substantially higher amounts are leached out, because the leaching solution is able to directly attack the CdTe layers from the surface. Therefore, we observe substantially higher amounts of eluted Te and slightly higher amounts of Cd for this one out of the three experimental runs. The leaching of Mo is highest from the beginning to the end and comparable to the leaching amounts of Cd and Te.

Figure 4d presents the leaching data for pH 11. Here, at the end of the experiment, the amount of eluted Mo is still high with $c_{Mo} \approx 34\%$. The measured concentration of Te is below 1% after 1.5 years, and the amount of leached Cd is the lowest. In solutions with pH 11, the time-dependent leaching rates of Cd and Te are much lower compared to the leaching rates in solutions with pH 7 and pH 3. For all conditions, the leaching rate of Mo is always higher than the one of Cd and Te. This indicates again that, in the case of CdTe modules, the Mo back contact is a weak spot.

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Battery 'Bombs': More Giant Renewable Energy Batteries Explode in Toxic Fireballs

July 31, 2021 by stopthesethings

8 Comments



'Bombs' are designed to store and quickly release copious amounts of energy, so are the mega-batteries said to save wind and solar from their hopeless intermittency.

The notion is that giant lithium-ion batteries will quell the power delivery chaos that comes with attempting to rely wholly weather-dependent wind power and wholly sunshine-dependent solar power; thereby bringing stability and security to plenty a power grid teetering on the brink of collapse, all the consequence of our "inevitable transition" away from reliable and dependable power generation sources, like coal and gas.

But there's nothing 'stable and secure' about lithium batteries.

As Samsung mobile phone owners are painfully aware, lithium batteries have a horrifying habit of spontaneous ignition. STT has fond memories of watching fellow airline passengers being berated for having a Samsung 7 in their pocket.

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No more onshore windfarms for West Clare say councillors #IRL August 10, 2021 And there have been plenty of incidents where the lithium batteries in Tesla's electric cars have exploded in flames.

Now, it's grid-scale explosions and conflagrations that we need to be concerned about, not just the odd exploding Telsa S and Samsung 7%

Here's a little saga from the land Downunder, where a giant Tesla decided to release a whole of 'wonderful green' energy in a furious hurry.

Crews battle Tesla battery fire at Moorabool, near Geelong ABC

Leanne Wong 30 July 2021

A toxic blaze at the site of Australia's largest Tesla battery project is set to burn throughout the night.

The fire broke out during testing of a Tesla megapack at the Victorian Big Battery site near Geelong.

A 13-tonne lithium battery was engulfed in flames, which then spread to an adjacent battery bank.

More than 150 people from Fire Rescue Victoria and the Country Fire Authority responded to the blaze, which has been contained and will be closely monitored until it burns itself out.

"If we try and cool them down it just prolongs the process," the CFA's Assistant Chief Fire Officer Ian Beswicke said.

"But we could be here anywhere from 8 to 24 hours while we wait for it to burn down."

The Tesla battery is expected to become the largest battery (or bomb) in the southern hemisphere as part of a Victorian Government push to transition to renewable energy.



stopthe: Solar St



David O **Storage**



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Ambulance Victoria members are also on site monitoring the health of firefighters.

A toxic smoke warning has been issued near Geelong.

Residents have been warned to close windows, close fireplace flues and bring their pets inside in the Batesford, Bell Post Hill, Lovely Banks and Moorabool areas.

No-one was injured and the site has been evacuated.

Australian Energy Market Operator (AEMO) said the battery had been isolated and disconnected from the main electricity grid and "there are no implications" for supply.



The Tesla battery was paid for by renewable energy company Neoen.

Neoen Australia's Managing Director, Louis de Sambucy said Neoen and Tesla were working closely with emergency services on site to manage the situation.

Health Impacts of \

Gary Weaven's Pac Neighbour from He

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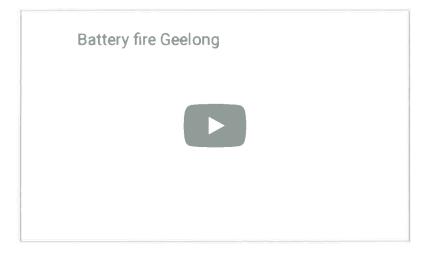
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Transcript

Ian Beswicke: Yeah, the plan is that we'll let the battery bank burn itself out. Now it's about 15 metres long by three metres high by three metres wide. There's another one right beside it that is currently burning as well. So we cannot put them out with water or anything else. The best way to deal with these things is to let them burn until they are burnt out. If we try and cool them down, it just prolongs the process. So by letting them burn, and this wind is helping us by keeping it burning fairly freely, but we could be here anywhere from eight to 24 hours whilst we wait for it to burn down.

ABC



So, there you have it – when one of these 'planet saving miracles' spontaneously bursts into a lethally toxic fireball, it's a case of burn, baby burn! No point attempting to extinguish the blaze, just keep clear of the toxic fumes and let it eventually burn itself out.

Oh, and if you think this is a rare and unusual occurrence, see our post here: Giant Batteries Bomb: Renewable Energy Storage Systems
Literally Setting The World On Fire

And here are a couple more for your "Blazing RE Battery" scrapbook -



More Photos

care of the team from Jo Nova;

Big batteries could be bigger bombs than Beirut Fertilizer Jo Nova Blog Jo Nova 13 July 2021

It turns out storing Megawatts of high density energy in a confined space is "like a bomb". Who could have seen that coming, apart from everyone who understands what a megawatt is?

Clean, green, noisy and explosive.

And they are "unregulated" in the UK.

GWPF

UK's giant battery 'farms' spark fears of explosions that can reach temperatures of 660C
Amy Oliver

Mail on Sunday

according to a troubling new report from leading physicists, these vast batteries amount to electrical bombs with the force of many hundreds of tons of TNT.

With the potential for huge explosions, fires and clouds of toxic gas, they could devastate towns and villages nearby, says Wade Allison, emeritus professor of physics at Oxford University and co-author of the report.

The batteries, designed as reservoirs of spare electricity for when the wind doesn't blow or the sun fails to shine, are spreading around the British countryside. And this, says Prof Allison and his fellow scientists, could spell catastrophe.

It's like a potential bomb,' he says. 'When batteries catch fire, you can't just squirt water on them and put out the flames. It's evident from our research that nothing has been done to tackle this problem.'

Given the size of the proposed plants, Prof Allison says this could, in theory, lead to an explosion several times bigger than the one that destroyed the harbour in Beirut last year.

The threat of fire is not merely theoretical. South Korea saw 23 battery farm fires in just two years. A recent battery fire in Illinois burned for three days and thousands of residents were evacuated.

Such blazes release highly toxic gases. One – hydrogen fluoride – is lethal if inhaled, and causes irreversible health effects after an

hour of exposure, according to Public Health England

Meanwhile **3 – 4,000 people** were evacuated in Morris Illinois the week before last, as 100 tons of batteries burned. The fire burned for days. They could not use water or foam, and in the end, the **burning batteries** were smothered with 28 tons of cement.

These were run of the mill cell-phone and car batteries.



State Declares Disaster For Morris After Battery Fire chicago.cbslocal.com/2021/07/05/mor...



Jo Nova Blog



One of South Korea's big batteries having a 'moment'

COMMENTS PREPARED FOR THE PUBLIC SCOPING MEETING HELD ON AUGUST 12, 2021

FOR THE BRAWLEY SOLAR ENERGY FACILITY PROJECT

SUBMITTED BY CAROLYN ALLEN ON BEHALF OF MYSELF, DONNA TISDALE,

LARRY COX and MICHAEL COX AS INDIVIDUALS . THESE COMMENTS ARE ALSO MADE ON BEHALF OF DONBEE FARMS AND BACKCOUNTRY AGAINST DUMPS

These comments are for the record.

During the scoping process for the Brawley Solar Energy Facility Project proposed by ORNi 30 LLC Some of the areas of concern we feel need to be addressed are:

- 1) This project converts both farmland of statewide importance and a little prime farmland. This project is another example of irresponsible placement of renewable energy facilities. Our countY'S agricultural resources are a finite resource that should not just be mitigated away!!
- 2) Loss of farm related jobs both on farm and in ag support business.
- 3) Damage to crops
- 4) Address affects for residents in the area. We have 2 homes for some of our farm employees
 That are directly across from the project. We worried about how this project might adversely
 affect them. For example exposure to EMF, Dirty Electricity, Contaminents etc
- 5) Destruction of wildlife habitat that farm crops provided
- 6) Concerns for How is this project and the cumulative renewable energy projects on farmground are going to affect our water rights.
- 7) How will this and other projects affect hydrology issues not only in the immediate project vicinity but also the vast and complex irrigation and drainage system here in the Valley
- 8) Extreme fire hazard posed by the batteries used in the Battery Energy Storage System & toxic smoke
- 9) Air quality issuesNoise pollution
- 10) Potential damage due to Contaminates from the project
- 11) There are at least 36 areas listed in the Initial Study showing "Potentially Significant Impacts" This shows just some of the many reasons why Large Solar Facilities should not be placed on farmland.

THESE SOLAR PROJECTS DO NOT BELONG ON FARMLAND

AUG 12 2021
IMPEHIAL COUNTY
PLANNING & DEVELOPMENT SERVICES

SUBMITTED BY Carolyn Allen

OPPOSITION COMMENTS: ORNI 30,LLC (BRAWLEY SOLAR)

GPA#21-0003; ZONE CHANGE #21-0003; CUP#20-0030, WSA & INITIAL STUDY #20-0041

DATE: August 30, 2021

TO: David Black, Planner IV via: davidblack@co.imperial.ca.us; Planning & Development Services Dept,

County of Imperial: cc: svolker@volkerlaw.com; jvolker@volkerlaw.com; jvolker@volker@volkerlaw.com; jvolker@volkerlaw.com; jvolker@volkerlaw.com; jvolker@volkerlaw.com; jvolkerlaw.com; jvolker@volkerlaw.com; jvolkerlaw.com; <

FROM: Donna Tisdale, Michael Cox, Carolyn Allen, Lawrence Cox; C/O Donbee Farm

Section 1 of the California Constitution grants "all people" "inalienable rights" and "among these rights are enjoying and defending life and liberty, acquiring, possessing, and protecting property, and pursuing and obtaining safety, happiness, and privacy" 1

These initial comments are submitted into the record on behalf of and at the request of our Cox Family members named above. Our concerns include but are not limited to the following:

The approximately 227 acre Brawley Solar Energy Facility project, with 40MW solar and 40 MW battery storage, is proposed on active farmland immediately west of Best Road and across from two actively farmed properties (Rockwood 131 & 131A-80 acres each), with two occupied employee homes, that the four of us own together. The two homes shown in the photos below are located within approximately 120 ft of the project at the corner of Best Road and Ward Road.



An Environmental Impact Report is required due to numerous project impacts.

Environmental Checklist Form @ page1:

- #8 Description of Project: A clarification is needed regarding the phrase (not to exceed 80 MW). Is that intended to cover both the solar PV and the Battery Energy Storage System (BESS), or does it mean just the BESS itself is not to exceed 80 MW?
- # 9 Surrounding land uses and setting:

¹https://leginfo.legislature.ca.gov/faces/codes displayText.xhtml?lawCode=CONS&division=&title=&part=&chapte r=&article=I

- This section failed to include our two existing and occupied employee houses documented in the photos above. Additional homes, located just east of the project boundaries, north of our two houses along Best Road, were not included.
- o A horse boarding / training facility with house to the south was not included either.

Environmental Factors Potentially Affected @ page 3:

- In addition to the 15 potentially significant impacts already listed in the Initial Study, the following additional 5 impacts should be added:
 - Energy: This section should address the life cycle impacts of solar panels and batteries that generally cannot be fully recycled, along with electrical pollution.
 - Housing: The use and enjoyment of the impacted homes / properties will be degraded by any approval, construction, and operation of an industrial scale solar / energy storage facility right next door.
 - Noise: Several adjacent homes and the horse boarding facility will be subjected to new noise emissions generated by the solar inverters, tracking systems, the battery storage facility, and all the industrial air conditioning units required to keep all that project equipment cool. Together, the noise could be significant and cumulatively significant.
 - Recreation: People who board, train, and / or ride their horses in the impacted area will
 have their experiences degraded. They may move their horses to another facility
 thereby potentially impacting the income of the owner of that facility.
 - Wildfire: The introduction of a solar energy / energy storage project adjacent to homes, hundreds of acres of crops that are often dry and more fire prone during harvest, and the vegetated New River bed represent a new significant source of wildfire and toxic smoke from burning batteries.

EVALUATION OF ENVIRONMENTAL IMPACTS @ PAGES 9-50

I.AESTHETICS:

- Our concerns include the change from rural open landscapes to cluttered and dense industrial y solar / battery facility with new glare and lighting.
- Our family members and employees may be subjected to glare from the project when working our adjacent fields and from our two employee homes.
- We request that the project setback be significantly increased and screened from view from our impacted properties and two existing homes.
- We also request that any night lighting be shielded and directed downward to reduce impacts.
- The FAA should be conducting a review of the project's impacts on the Brawley Municipal Airport. Several of our family members are pilots who use the Brawley airport. The FAA is currently conducting a review of the Jacumba Valley Ranch Solar project that impacts the Jacumba Airport in southeastern San Diego County, just west of the Imperial County line.

II. AGRICULTURE RESOURCES:

 We strongly oppose the conversion of productive designated Farmland of Statewide Importance and Prime Farmland into industrial solar.

- It is our understanding that there are already over 23,000 acres of solar either operating, approved, or pending in Imperial County.
- These solar conversion projects represent death by a thousand cuts to viable farming.

III.AIR QUALITY:

- The biggest concern is the potential for a long construction period that will expose our employees and tenants to increased levels of dust and particulates.
- We are also concerned with the potential for toxic smoke from battery fires that may require evacuation of the immediate area that could impact / disrupt our tenants and farming operations. This has happened recently in the US and Australia.

IV. BIOLOGICAL RESOURCES:

- Displacement of wildlife is always a concern.
- The adjacent freshwater ponds and the New River may attract avian species that could mistake the solar panels for water, thereby causing collisions and potential injuries /death.

V. CULTURAL RESOURCES:

No comment pending Cultural Resources Report.

VI.ENERGY:

- It is good to see recognition for the "Energy used in the production of construction materials, such as asphalt, steel, concrete, and manufactured or processed materials such as lumber and glass."
- However, where is recognition of the energy that will be consumed during the disposal / recycling / transport of degraded / discarded /replaced solar panels and batteries?
- Where is recognition of energy needed to transport all the project construction materials to the project site?
- Where are those supplies coming from?
- Are they traveling by cargo ship from Asia, are they traveling by truck, train or air transport? What type of fuel and how much will be consumed in total?
- The Operations-Related Electricity section refers to the project providing a significant renewable resource for the IID that would help the IID achieve State Renewable Portfolio Standards.
- Does the IID have a Power Purchase Agreement with the Brawley Solar project?
- If not, how will the project benefit the IID as alleged?
- How can the alleged project-generated 2.8 % of energy consumed by IID be considered "significant" as claimed?
- The amount of energy this project will consume for all of the project's electronic components including HVAC units must be disclosed.
- BESS: All the energy consumed to mine the minerals and other materials used for the battery storage system must also be disclosed and accounted for.
- Energy Storage System = Fire hazard

- Generally, the battery storage units are 1 MW each which means there will be about 40 such cargo sized containers.
- They will all have air conditioning units that will consume lots of energy and make lots of noise / vibrations that will carry in the generally quiet rural area.
- SDG&E has reportedly met CPUC mandated 165 MW of energy storage procurement with 30 MW Escondido ESS (400,000 batteries), and five other systems that all use lithium-ion battery technology.².
- Photo below shows battery containers at SDG&E's Escondido Energy Storage facility as published and described below in a Utility Dive article (12-6-16)³ as an example of what the proposed 40 units may look like.



- Using a battery to meet demand peaks means it will likely be fully charged and discharged nearly every day. That puts a lot of strain on lithium batteries, which degrade as they get older and are cycled more often.
- Under SDG&E's contract, AES must maintain the batteries' nameplate capacity and performance for 10 years, after which the utility takes responsibility for the project. Typically this is done two ways — by oversizing a battery project upfront or by adding new cells during operation to support capacity.
- The statement above indicates that more batteries will be added as old batteries degrade. Degraded batteries are reportedly less stable.
- Some ESS systems include coolant pumps, fans, exhaust manifolds, and radiators that use ethylene glycol.4
 - Ethylene glycol (HOCH,CH,OH)⁵ is a colorless, syrupy liquid. It can harm the eyes, skin, kidneys, and respiratory system. Ethylene glycol can cause death if swallowed. Workers may be harmed from exposure to ethylene glycol. The level of exposure depends upon the dose, duration, and work being done.

https://www.cdc.gov/niosh/topics/ethylene-glycol/default.html

² https://www.sandiegouniontribune.com/business/energy-green/sd-sdge-energystorage-20170421-story.html

³ Utility Dive 12-6-16: https://www.utilitydive.com/news/inside-construction-of-the-worlds-largest-lithium-ionbattery-storage-faci/431765/

At page 29: https://www.nfpa.org/-/media/Files/News-and-Research/Resources/Research-Foundation/Symposia/2016-SUPDET/2016-Papers/SUPDET2016BlumLong.ashx?la=en

- 2018 IFC Battery Room Protection Automatic smoke detection system per Section 907.2. Signage on or near battery room doors⁶: Cautionary markings to identify hazards with specific batteries (corrosives, water reactive, hydrogen gas, Li-ion batteries, etc.)
 - Do the batteries release toxic/highly toxic gases during charging, discharging, and normal use?
 - 2018 IFC Battery Specific Protection Systems that release toxic/highly toxic
 gases during charging, discharging and normal use must comply with Chapter
 60⁷ Exhaust ventilation is required for system that produce combustible gases
 during normal use Spill control and neutralization required for systems with
 liquid electrolytes.
 - Gas Safety risks in Li-Ion battery charging rooms8:
 - Li-lon batteries when overcharged or short circuited are overheated and catch fires
 - Li-Ion battery fires have caused great concern because of risks due to spontaneous fires and intense heat generated by such fires
 - As a result of the above-said a lethal amount of toxic Hydrogen Fluoride Gas, HF is generated.
 - HF from Li-Ion battery fires can pose severe gas safety risks in confined spaces like battery charging rooms, renewable energy storage plants in solar or wind power plants
 - The electrolyte in Li-lon battery is flammable and generally contains Lithium Hexa- fluoro -phosphate (LiPF6)
 - In the event of overheating due to overcharging or short circuiting and backed by high temperature, the electrolyte in Li-Ion batteries will vaporise liberating toxic gases like CO, CO2, HF (hydrogen fluoride)
 - The moisture and humidity will further exacerbate the situation generating more HF (reaction of LiPF6 with water or humidity)
 - Typical HF concentration expected can be as high as 20-200 ppm of HF (NIOSH/USA Safety limit, TWA:3 ppm HF, STEL: 6 ppm HF)

⁶ At page 21: https://www.iccsafe.org/wp-content/uploads/Energy-Storage-Systems-Fire-Safety-Concepts-in-the-2018-IFC-and-IRC.pdf

At page 21: https://www.iccsafe.org/wp-content/uploads/Energy-Storage-Systems-Fire-Safety-Concepts-in-the-2018-IFC-and-IRC.pdf

⁸ http://www.alviautomation.com/lithium-ion-battery-fires-hydrogen-fluoride-detector/



OPEN Toxic fluoride gas emissions from lithium-ion battery fires

Fredrik Larsson^{1,2}, Petra Andersson², Per Blomqvist² & Bengt-Erik Mellander¹

Received: 11 April 2017 Accepted: 28 July 2017 Published online: 30 August 2017 Lithium-ion battery fires generate intense heat and considerable amounts of gas and smoke. Although the emission of toxic gases can be a larger threat than the heat, the knowledge of such emissions is limited. This paper presents quantitative measurements of heat release and fluoride gas emissions during battery fires for seven different types of commercial lithium-ion batteries. The results have been validated using two independent measurement techniques and show that large amounts of hydrogen fluoride (HF) may be generated, ranging between 20 and 200 mg/Wh of nominal battery energy capacity. In addition, 15-22 mg/Wh of another potentially toxic gas, phosphoryl fluoride (POF₃), was measured in some of the fire tests. Gas emissions when using water mist as extinguishing agent were also investigated. Fluoride gas emission can pose a serious toxic threat and the results are crucial findings for risk assessment and management, especially for large Li-ion battery packs.

Main Risks and Target Organs

Hydrogen fluoride is highly corrosive to all tissues.

Skin: Burns, necrosis; underlying bone may be decalcified.

Eyes: Burns.

Gastrointestinal: After ingestion, the oropharynx and the

oesophagus are the primary sites of injury.

Heart: Systemic absorption occurs following skin

> exposure or ingestion; severe and rapid hypocalcaemia may ensue with cardiac

dysrhythmia and arrest.

Lungs: After inhalation, severe pulmonary injury may

occur with pulmonary oedema and

bronchopneumonia.

Neuromuscular: Tetany may occur due to hypocalcaemia after

systemic absorption.

Hydrogen Fluoride (Hydrofluoric Acid) 7664-39-3 Hazard Summary: Hydrogen fluoride is used in the production of aluminum and chlorofluorocarbons, and in the glass etching and chemical industries. Acute (short-term) inhalation exposure to gaseous hydrogen fluoride can cause severe respiratory damage in humans, including severe irritation and lung edema. Severe eye irritation and skin burns may occur following eye or skin exposure in humans. Chronic (long-term) exposure in workers has resulted in skeletal fluorosis, a bone disease. Animal studies have reported effects on the lungs, liver, and kidneys from acute and chronic inhalation exposure to hydrogen fluoride. Studies investigating the carcinogenic potential of

⁹ https://www.researchgate.net/publication/319368068 Toxic fluoride gas emissions from lithium-ion battery fires

hydrogen fluoride are inconclusive. EPA has not classified hydrogen fluoride for carcinogenicity. ¹⁰

Inverters, Transformers & Associated Equipment

• The photo below was taken by Donna Tisdale in September 2013 at one of the industrial solar projects built on productive farm land in South Western Imperial County, south of I-8.



- The actual type of inverters/transformers planned for Brawley Solar should be disclosed during public comment—not after-the-fact. They are noisy and can emit electrical pollution/ dirty electricity that can move off-site through the air and the ground.
- Electrical Magnetic Interference (EMI) and Radio Frequency Interference (RFI) are common electrical pollution problems that must be addressed¹¹, especially when the project is proposed so close to non-participating residents.
- Wind and solar projects dump energy into the ground when they are curtailed and when harmonics pose a threat to their own equipment. That transient/stray voltage moves off-site and into homes and businesses through plumbing and other grounded equipment. Energy can also be radiated through the air and inducted into occupied structures through utility lines.
- French farmers say wind turbines and solar panels have killed hundreds of their cows¹²
 - Cows are being killed by electricity travelling through the ground, farmers claim.
 - French farmer says hundreds of cows being killed by solar panels and turbines.
 - Cattle in Brittany began losing weight and eventually died so land was tested.
 - Electrical current was said to be found coming thought the earth and the water.
- Majid Bagheri Hosseinabadi, Narges Khanjani, Mohammad Hossein Ebrahimi, Bahman Haji & Mazaher Abdolahfard (2019) The effect of chronic exposure to extremely low-frequency electromagnetic fields on sleep quality, stress, depression and anxiety, Electromagnetic Biology and Medicine, 38:1, 96101, DOI: 10.1080/15368378.2018.1545665

¹⁰ https://www.epa.gov/sites/production/files/2016-10/documents/hydrogen-fluoride.pdf

¹¹ https://www.solar-electric.com/reducing-electromagnetic-interference-pv-systems.html

https://www.dailymail.co.uk/news/article-6855801/French-farmers-say-wind-turbines-solar-panels-killed-hundreds-cows.html

- Abstract: (emphasis added): "Exposure to extremely low-frequency electromagnetic fields (ELF-EMF) is inevitable in some industries. There are concerns about the possible effects of this exposure. The present study aimed to investigate the effect of chronic exposure to extremely low-frequency electromagnetic fields on sleep quality, stress, depression and anxiety among power plant workers.
- In this cross-sectional study, 132 power plant workers were included as the exposed group and 143 other workers were included as the unexposed group. The intensity of ELF-EMF at work stations was measured by using the IEEE Std C95.3.1 standard and then the time weighted average was calculated. Sleep quality, stress, depression and anxiety were measured by using the Pittsburgh Sleep Quality Index Questionnaire; and the Depression, Anxiety and Stress Scale.
 - The workers in the exposed group experienced significantly poorer sleep quality than the unexposed group. Depression was also more severe in the exposed group than the unexposed group (P = 0.039). Increased exposure to ELF-EMF had a direct and significant relation with increased stress, depression, and anxiety. Sleep quality in technicians with the highest exposure was significantly lower than the other groups.
 - This study suggests that long-term occupational exposure to ELF-EMF may lead to depression, stress, anxiety and poor sleep quality."
- Electromagnetic field (ELF-EMF) on cytokines of innate and adaptive immunity, Electromagnetic Biology and Medicine, 38:1, 8495, DOI: 10.1080/15368378.2018.1545668¹³
 - Abstract: (emphasis added) "Extremely low frequency electromagnetic field (ELF-EMF) is produced extensively in modern technologies. Numerous in vitro and in vivo studies have shown that ELF-EMF has both stimulatory and inhibitory effects on the immune system response. This review was conducted on effects of ELF-EMF on cytokines of innate and adaptive immunity. Mechanisms of ELF-EMF, which may modulate immune cell responses, were also studied. Physical and biological parameters of ELF-EMF can interact with each other to create beneficial or harmful effect on the immune cell responses by interfering with the inflammatory or anti-inflammatory cytokines. According to the studies, it is supposed that short-term (2-24 h/d up to a week) exposure of ELFEMF with strong density may increase innate immune response due to an increase of innate immunity cytokines. Furthermore, long-term (224 h/d up to 8 years) exposure to low-density ELF-EMF may cause a decrease in adaptive immune response, especially in Th1 subset."
- Effects of Exposure to Electromagnetic Fields: 833 Studies¹⁴;Posted February 1, 2018 on Electromagnetic Radiation Safety by Joel M. Moskowitz, Ph.D. Director Center for Family and Community Health, School of Public Health University of California, Berkeley:
 - Government and industry-linked scientists often claim that the research on the effects
 of exposure to electromagnetic fields (EMF) is inconsistent, and that more research is

https://www.researchgate.net/publication/329451963 A review on the effects of extremely low frequency electromagnetic field ELF-EMF on cytokines of innate and adaptive immunity

¹⁴ https://www.saferemr.com/2018/02/effects-of-exposure-to-electromagnetic.html

- needed before precautionary warnings are issued or regulatory guidelines are strengthened.
- Although most of the research on cell phones has focused on radio frequency radiation (RFR), these wireless devices also produce extremely low frequency electromagnetic fields (ELF EMF). The International Agency for Research on Cancer of the World Health Organization classified ELF EMF "possibly carcinogenic to humans" (Group 2B) a decade earlier than RFR.
- o Dr. Henry Lai, Professor Emeritus at the University of Washington and Co-Editor-in-Chief of the journal Electromagnetic Biology and Medicine, has compiled summaries of several areas of the research on the biologic and health effects of exposure to RFR and ELF EMF. His sets of abstracts which cover the period from 1990 to 2017 constitute a comprehensive collection of this research.
- o Dr. Lai finds that the preponderance of the research has found that exposure to RFR or ELF EMF produces oxidative stress or free radicals, and damages DNA. Moreover the preponderance of RFR studies that examined neurological outcomes has found significant effects.
- o The evidence for DNA damage has been found more consistently in animal and human (in vivo) studies than in studies of cell samples (in vitro).
- The abstracts can be downloaded from the BioInitiative web site¹⁵.
- o Top Line Results Radiofrequency radiation: 2
 - 90% (n=180) of 200 oxidative stress (or free radical) studies report significant effects.
 - 64% (n=49) of 76 DNA comet assay studies report significant effects.
 - 54% (n=25) of 46 in vitro studies report significant effects. 2 80% (n=24) of 30 in vivo studies report significant effects.
 - 72% (n=235) of 325 neurological studies report significant effects.
- Extremely low frequency electromagnetic fields:
 - 87% (n=162) of 186 oxidative stress (or free radical) studies report significant effects.
 - 74% (n=34) of 46 DNA comet assay studies report significant effects.
 - 68% (n=21) of 31 in vitro studies report significant effects.
 - 87% (n=13) of 15 in vivo studies report significant effects

VII. GEOLOGY & SOILS

- o How much soil will be moved?
- o Will any topsoil be removed off-site?
- o Previous verbal reports allege that top soil was removed off-site in large amounts from one or more of the large solar projects built near Mount Signal which could impact potential for any future return of the site to farming use.

VIII.GREEN HOUSE GAS EMISSIONS:

¹⁵ http://bioinitiative.org/research-summaries/

- See Energy comments above regarding life cycle green house gas emissions from cradle to grave for the PV solar panels, batteries, and other equipment that will be used, along with full accounting of manufacturing and transport of all project related materials.
- This section must address the increased Particulate Matter from grading and Green House Gas emissions from the use of diesel equipment, and potential to use less polluting options like natural gas, and other project GHG sources noted in these comments.
- The gen-tie line and project components will generate off-gassing and electrical pollution that radiates through the air and through increased ground currents.
- Sulfur hexafluoride (SF6)¹⁶, an extremely potent Green House Gas used in electrical equipment.
 What are the impacts and proposed alternatives and mitigation?
- o Installation, maintenance, and decommissioning and leakage from SF6 containing GIE.11 Closed-pressure equipment is the category of GIE that is the most susceptible to SF6 emissions. Emissions associated with sealed-pressure equipment mostly occur during the manufacturing process and at disposal. Below is an overview of potential sources of SF6 in transmission and distribution equipment, focusing on closed-pressure equipment. At the disposal stage, all equipment can release SF6. Therefore, proper handling, storage, and disposal procedures are critical to reduce emissions of SF6 into the atmosphere."
- According to the EPA's Overview of SF6 Emissions Sources and Reduction Options in Electric Power Systems (2018)¹⁷, "Potential sources of SF6 emissions occur from 1) losses through poor gas handling practices during equipment installation, maintenance, and decommissioning and 2) leakage from SF6 -containing GIE."

IX. HAZARDS & HAZARDOUS MATERIALS

- Section a) should be changed from Less than Significant to Potentially Significant due to the proposed full use of the Battery Energy Storage System that represents a serious hazard and the potential for release of hazardous materials and toxic smoke during batter fires.
- How many tons of batteries will be required for the 40 MW BESS?
- See comments on battery fires below. Battery fires can result in toxic smoke and melted hazardous materials pooling on the ground and potentially moving off-site.
- Studies have shown the heavy metals in solar panels namely lead and cadmium can leach
 out of the cells and get into groundwater, as well as affect plants. These metals also have a
 record for detrimental effects on human health.¹⁸
- Cleaning after Solar Panels: A Circular Outlook 19
 - A. Serasu Durana, Atalay Atasub and Luk N. Van Wassenhoveb
 *aHaskayne School of Business, University of Calgary, Calgary, Canada; b. Technology and
 Operations Management Area, INSEAD, Fontainebleau, France
 - (Excerpt:)) "Yet, a darker future for solar technology looms if we fail to adopt a circular economy outlook by considering the entire life cycle of solar panels. There are direct consequences when these products reach the end of their lives. Their complex

¹⁶ http://climate.columbia.edu/files/2012/04/GNCS-SF6-Factsheet.pdf

https://www.epa.gov/sites/production/files/2018-08/documents/12183_sf6_partnership_overview_v20_release_508.pdf

¹⁸ https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5607867/

¹⁹ See page 2-3: https://drive.google.com/file/d/1CeYskmVtIQ8-WBnOJtJR-lq2808nKY0S/view

composition (e.g., the ever-growing panel sizes and Ethylene Vinyl Acetate (EVA) encapsulated glass/metalmix) implies substantial challenges in creating circular solutions. Meanwhile, economic incentives are aligning to encourage customers to trade their existing panels for newer, cheaper, more efficient models. That makes it nearly impossible to imagine a strong market for used solar panels. The products must therefore be recycled. However, the availability of environmentally or economically effective recycling infrastructures and technologies for solar panels is very limited (McDonald and Pearce 2010; Sica et al.2018). It is not difficult to predict that their fate will be in landfills or incineration..."

- Section g) should address an access route from Ward Road to the substation and BESS, instead of having to access that area from planned access along Best Road.
- The main access should be from Ward Road instead of Best Road to reduce impacts to adjacent residents during construction.

X. HYDROLOGY & WATER QUALITY:

- One concern is the potential for hazardous materials to leach out of the installed or discarded solar panels and flushed from the project site into the drains during rain events.
- In the event the project site is eventually returned to agriculture use will the water availability for growing food and fiber still be there?
- Pegex Hazardous Waste Experts²⁰: (excerpt)
 - An Inconvenient Truth: Solar Panels Wear Out and They're a Potent Source of Hazardous Waste. Basically, there are two kinds of solar panels. Each must be recycled in its own peculiar way.
 - **Silicon-based panels** are more common. Recycling requires disassembly in order to separate aluminum from glass. Treatment of what remains begins in a thermal processing unit where it's cooked to 500°C (932° F)—and that's just the start.
 - Thin-film solar panels require even more radical processing. They're shredded and mechanically hammered to ensure that no one particle is bigger than 4to5mm. Both solids and liquids remain, which require separation and further exotic treatments.

XI. LAND USE & PLANNING

- Project is NOT located within or near the existing Renewable Energy Overlay Zone²¹
- Project represents conflicts with adjacent farming, residences, and horse boarding / training facility.
- We strongly object to conversion of productive farmland to solar energy / battery storage facility adjacent to our own farmland and employee housing.
- We oppose the proposed General Plan Amendment and Zone Change will result in an unnecessary conflict and will serve to encourage more solar conversion of productive land in the area.

²⁰ https://www.hazardouswasteexperts.com/solar-panels-wear-out-hazardous-waste/

https://icpds.maps.arcgis.com/apps/Viewer/index.html?appid=c6fd31272e3d42e1b736ce8542b994ae

• Imperial County has already converted tens of thousands of acres of land for industrial solar projects.

XII. MINERAL RESOURCES: No comment

XIII. NOISE

- Sections a) and b) should be changed from Less Than Significant to Potentially Significant
 Impact, especially for chronic operational noise impacts for adjacent residences and the horse
 facility.
- Power conversion equipment, inverters (DC to AC), transformers, switchgears, PV module tracking motors, HVAC units and battery energy storage systems, and power lines, all make noise; complicated noise.
- BESS are fairly new and the impacts not well recognized or understood. With all the AC required to keep them cool, there may be unpredicted noise / vibration impacts.
- Solar Panels Create Noise Nuisance in Edgartown, Vineyard Gazette, by Olivia Hull (9-25-14)²²



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- Excerpts -emphasis added:
- Smith Hollow is a quiet neighborhood in Edgartown where the ambient sounds include distant traffic and breeze moving through the trees.
- O But this past summer, the installation of a new municipal solar array added a new sound to the mix: incessant humming that all but drowns out the other sounds at some Smith Hollow residences.
- As soon as the solar project went live, inverters, the part of the system that converts direct current from the sun to alternating current, began emitting noise on sunny days.
 Neighbors complained, and the town hired an expert to investigate.
- The inspection revealed that the sound coming from the inverters exceeds ambient sounds in all eight octaves by a significant margin, according to a report discussed by the town selectmen Monday.
- "The sound from the inverters is clearly in violation of the Mass. DEP Noise Policy, and also constitutes a noise nuisance, in my opinion, based on the sound level measurements reported here," wrote Lawrence G. Copley, a sound engineer, in the noise assessment he presented to the town.

https://vineyardgazette.com/news/2014/09/25/solar-panels-create-noise-nuisance-edgartown

- Upon reading another paper, Harmonics and Noise in Photovoltaics: PV Inverter and the Mitigation Strategies²³, even a layman realizes that inverters generate high frequency noise of various sorts and complexities, often with weird harmonics.
- In another article the German inverter manufacturer SMA Solar Technology describes its experience sleuthing out persistent inverter noise emissions, analyzing²⁴:
 - structure-borne noise transfer paths
 - o transfer of airborne noise and its effects
 - noise caused by vibrations
 - Resonance frequency testing
- Project components will also be subject to wind generated noise that results in potentially significant rattling of P V Modules, slatted chain link fencing and more.
 - Sample Noise Emission Values of a three phase commercial solar inverter
 - The table below is from the NOISE REPORT ODOT Solar Highway Project: West Linn Site Clackamas County, it shows the dBA noise level of commercial inverters at the Clackamas solar project. Understanding the dBA noise from a commercial inverter is an important component in siting an inverter at solar project. 25

Table 3. Inverter Noise Levels at Various Distances with Four Inverters at IM7				
Location of Source (number of inverters)	Noise Level at 50 Feet	Receiver Location	Distance from Source to Receiver	Noise Level from Inverters at Receiver
	dBA		(feet)	Leq/dBA
I10 (3)	64	RM6	800	40
IM5 (3)	64		360	47
IM7 (4)	65		2040	33
I10 (3)	64	RM8	1280	36
IM5 (3)	64		1800	33
IM7 (4)	65		216	52
I10 (3)	64	R11	224	51
IM5 (3)	64		544	43
IM7 (4)	65		1336	36

Collector Substation

Industry is well aware that along with the potential for electrical pollution to move offsite through the air and ground from solar project and substations, there is also the potential for substation noise to leave the site through air and ground pressure waves that can be perceived at distance.

Cautions and recommendations from the Electrical Engineering Portal²⁶ include the following:

- Substation Noise Sources to take into consideration:
- Continuous audible sources
 Continuous radio frequency (RF) sources
- Impulse sources
- Equipment noise levels

https://docplayer.net/17995775-Harmonics-and-noise-in-photovoltaic-pv-inverter-and-the-mitigation-strategies.html

²⁴ https://www.sma.de/en/partners/knowledgebase/reducing-noise-in-pv-power-plants.html

https://electrical-engineering-portal.com/audible-substation-noise

https://www.civicsolar.com/support/installer/articles/electrical-noise-emissions-solar-pv-inverter-charger

- Attenuation of noise with distance
- Noise Abatement Methods to take into consideration:
 - Reduced transformer sound levels
 - Low-impulse noise equipment 2 RF noise and corona-induced audible noise control
 - Site location
 - Larger yard area

 - Active noise cancellation techniques

Switchyard

- o Switching gear could be a total of 60 feet tall and should require a height limit waiver.
- Remotely controlled SCADA system (no local employee) also creates Radio Frequency Electromagnetic Radiation and potentially other emissions if the system is wireless.
- Photos below were taken by Donna Tisdale (September 2013) of solar project components located in south western Imperial County, south of I-8 and Hwy 98. They give an idea of actual visual conversion from previously productive farmland/open space into industrial scale solar clutter/sprawl.



XIV. POPULATION & HOUSING:

An adverse impact on existing housing is the issue here. Noise and other project operational
impacts may induce the abandonment of existing affordable homes and displacement of
residents through no fault of their own.

XV. PUBLIC SERVICES

- Clear emergency contact signage should be required at all project access points that are accessible to the public so they can report any problems for this unmanned facility.
- Dozens of high profile battery storage fires have occurred in the last few months and years around the world.²⁷
- See comments under Wildfire below.
- California passed SB 489 in 2015 to provide guidance for the safe disposal of defunct solar panels, designating them as universal waste. Universal waste cannot be trashed or landfilled in California²⁸
- Energy Storage Systems Fire Safety Concepts in 2018 IFC and IRC: Hazard Mitigation Analysis:²⁹
 - The HMA will evaluate the consequences of failure modes Thermal runaway in a single battery array • Failure of the energy management system • Failure of ventilation system • Voltage surges on the primary • Short circuits on the load side of the batteries • Failure of the smoke or gas detection, fire suppression The fire code official is authorized to approve the hazardous mitigation analysis based on the HMA. The HMA is a tool to address unknowns with new technologies
- There have been numerous hazardous conditions generated by battery storage fires including major fires in Surprise AZ, Morris, Illinois and Tesla's Big Battery in Australia:



The Morris fire (above) forced thousands of people from their homes for several days.

²⁷ https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/burning-concernenergy-storage-industry-battles-battery-fires-51900636

https://www.hazardouswasteexperts.com/solar-panels-wear-out-hazardous-waste/

https://www.iccsafe.org/wp-content/uploads/Energy-Storage-Systems-Fire-Safety-Concepts-in-the-2018-IFCand-IRC.pdf

"June 29, 2021: U.S. EPA responded to the Morris Lithium Battery Fire in Morris, Illinois, to provide guidance and support to the Morris Fire Department, the lead agency at the response. As of 6:30 p.m. on June 29, there were two U.S. EPA responders on-site, supported by eight contractors to set up a network of fixed and roaming air monitors around the perimeter of plume and within residential areas. As the wind direction changes, the roaming monitors are moved to follow the plume and to provide real-time data to the responders. U.S. EPA has five AreaRAE Pro monitors, five DustTrak monitors and multiple air samplers available for site use. The air monitoring network looks for volatile organic compounds (VOCs), oxygen (O2), hydrogen sulfide (H2S), carbon monoxide (CO), lower explosive limit (LEL), and particulates in coordination with the Illinois Civil Support Team. Because lithium battery fires can generate flouride gas emissions, U.S. EPA is also monitoring for hydrogen flouride (HF). U.S. EPA is currently evaluating the data received. Current data have not shown levels above Agency for Toxic Substances and Disease Registry (ATSDR) and Illinois Department of Public Health (IDPH) thresholds. This will be further evaluated."30



- The July 29, 2021 Tesla battery storage fire in Australia (photos above& below) required 30 fire rigs and 150 firefighters over several days:
 - (excerpt) "... A toxic blaze at the site of Australia's largest Tesla battery project is set to burn throughout the night. The fire broke out during testing of a Tesla megapack at the Victorian Big Battery site near Geelong. A 13-tonne lithium battery was engulfed in flames, which then spread to an adjacent battery bank. More than 150 people from Fire Rescue Victoria and the Country Fire Authority responded to the blaze, which has been contained and will be closely monitored until it burns itself out."If we try and cool them down it just prolongs the process," the CFA's Assistant Chief Fire Officer Ian Beswicke said."But we could be here anywhere from 8 to 24 hours while we wait for it to burn down..."32

³⁰ https://response.epa.gov/site/site_profile.aspx?site_id=15259

ABC Screen Shot by Nick Hide/CNET https://www.cnet.com/news/tesla-battery-fire-renewable-energy-plant- australia/ https://www.abc.net.au/news/2021-07-30/tesla-battery-fire-moorabool-geelong/100337488

A toxic smoke warning was issued.



XVI. RECREATION:

 Again, this project has the potential to adversely impact use and enjoyment of recreation opportunities at existing homes and the horse boarding / training facility on Best Road just south of the project site.

XVII.TRANSPORTATION

- Accommodation must be made for farm traffic during construction which will likely impact traffic on Best and Ward Roads during critical planting, harvesting, and other related work on adjacent farmland.
- Experience with construction of other large energy projects confirms adverse impacts to local road surface conditions which are already rough.
- The project developer should be required to repair / upgrade the road surface after construction is completed as mitigation.
- What is the required setback / easement from the railroad tracks?

XVIII. TRIBAL CULTURAL RESOURCES: No comments

XIX. UTILITIES & SERVICE SYSTEMS

- Section d) should be changed from Less than Significant to Potentially Significant Impact due to undisclosed end of life destination for solar panels and batteries.
- Disposal of potentially hazardous solar panels and batteries is controversial and unlawful in California.
- Recycling facilities must be developed or developer take back agreements must be included in permitting process.
- See comments on IX Hazards & Hazardous Materials above.

The Solar Trash Wave According to our research, cumulative waste projections will rise far sooner and more sharply than most analysts expect, as the below graph shows. The green "no failure" line tracks the disposal of panels assuming that no faults occur over the 30-year life cycle; the blue line shows the official International Renewable Energy Agency (IRENA) forecast, which allows for some replacements earlier in the life cycle: and the red line represents waste projections predicted by our model. Cumulative capacity 20 gigawatts NO FAILURE REGULAR LOSS (IRENA) EARLY REPLACEMENT 10 5 0 2020 '30 '35 '45 '25 '50

• The graphic above was sourced from the Harvard Business Review (6-18-21) **The Dark Side of Solar Power by Atalay Atasu, Serasu Duran, and Luk N. Van Wassenhove**:

⊟ HBR 33

- In addition to the proposed substation and Battery Energy Storage System, we request that any microwave towers, inverters, and transformers be placed as far away as possible from our property and two existing homes.
- Fiber optic is preferred over microwave tower to reduce microwave radiation impacts.

Source: International Renewable Energy Agency,

lectricity Data Browser, Global Solar Atlas

XX. WILDFIRE

Section c) should be changed from Less than Significant to Potentially Significant Impact due
to the required installation and full time operation of the associated BESS infrastructure that
"...may exacerbate fire risk or that may result in temporary or ongoing impacts to the
environment".

https://hbr-org.cdn.ampproject.org/v/s/hbr.org/amp/2021/06/the-dark-side-of-solar-power?amp_gsa=1&_js_v=a6&usqp=mq331AQFKAGwASA%3D#amp_tf=From%20%251%24s&aoh=16241641 204897&csi=0&referrer=https%3A%2F%2Fwww.google.com&share=https%3A%2F%2Fhbr.org%2F2021%2F06 %2Fthe-dark-side-of-solar-power

- The Brawley Solar project has the potential to ignite wildfires through attraction of lightning strikes and/or through electrical faults or other malfunctions in project components resulting in potentially hazardous fumes and waste.
- Battery storage represents additional sources of wildfire ignition and hazardous / toxic fumes generated by burning lithium ion batteries and thermal runaway events.

XXI. MANDATORY FINDINGS OF SIGNIFICANCE

Section b) should be adjusted to include the following impacts: Noise; Recreation; Housing;
 Wildfire and Energy as discussed in these comments.

The Overall Site Plan provided in the Initial Study / NOP is fuzzy and hard to read. A better copy that is clearer should be provided in the Draft EIR.

Thank you for consideration of these comments...

###

VISUAL IMPACT ASSESSMENT FOR THE BRAWLEY SOLAR PROJECT IMPERIAL COUNTY, CALIFORNIA

Prepared for:

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Prepared by:

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August 2021

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SECTION 1.0 – INTRODUCTION

Chambers Group, Inc. (Chambers Group) was retained by ORNI 30, LLC (ORNI) to prepare this technical report assessing the current surrounding conditions and to describe potential changes to the landscape resulting from the Brawley Solar Energy Facility (Project) development. The Project would be located on six privately owned parcels covering approximately 227 acres in Brawley, Imperial County (Figure 1).

The 40 Megawatt (MW)/160 Megawatt hour (MWh) photovoltaic (PV) solar farm and 40 MW/160 MWh battery energy storage system (BESS) would consist of 3.2-foot by 6.5-foot photovoltaic (PV) modules (or panels) on single-axis horizontal trackers in blocks that each hold 3,809 PV panels in 28 strings. The panels would be oriented from east to west for maximum exposure and the foundation would be designed based on soil conditions. The PV panels are made of a poly-crystalline silicon semiconductor material encapsulated in glass. A 20-foot wide road with an all-weather surface would surround the panels, and the entire site would be surrounded by a 6-foot tall chain link fence topped with three strands of barbed wire.

The proposed Project substation would be a new 92/12 kV unstaffed, automated, low-profile substation. The dimensions of the fenced substation would be approximately 300 feet by 175 feet. The enclosed substation footprint would encompass approximately 1.2 acres of the Project parcel and be located immediately southwest of the solar field.

The Project would connect to a switchyard located in the southeast corner Project site and then be routed through the BESS building for energy storage. Power would then be transferred to the North Brawley Geothermal Power Plant substation via a 1.8mile-long double circuit 13.8 and 92 kV gen-tie line with 66-foot-high poles to interconnect to the Imperial Irrigation District (IID) at the North Brawley 1 substation located at Hovley Road and Andre Road, southwest of the Project site. The transmission line would span the New River. A 12-inch diameter conduit railroad undercrossing would connect the PV arrays from the western side of the railroad tracks to the inverters on the eastern side.

SECTION 2.0 – EXISTING CONDITIONS

The Project is located at 5003 Best Ave, Brawley, California on six privately owned parcels: Assessor's Parcel Numbers (APNs) 037-140-020, 037-140-021, 037-140-022, 037-140-023, and 037-140-006 (Project site) as shown in Figure 1. Imperial County identifies the land use of the Project site as Agriculture and zoning as General Agricultural (A-2-G; County 2020). Currently the Project site contains alfalfa fields within different levels of harvest. North and east of the Project site is undeveloped agricultural land.

The Project site is approximately one mile north from the City of Brawley's jurisdictional limit. Brawley is relatively central within the agricultural portion of the Imperial Valley, which extends from the southeastern portion of the Salton Sea to the United States and Mexico border. Beyond miles of agricultural land, the 45-mile-long and 20-mile-wide Salton Sea lies northwest of the Project site. The elevation at the Project site is approximately 145 feet below mean sea level. With elevations extending to 277 feet below sea level, the Salton Sea sits comparatively lower in the landscape than the Project site, as does much of the agricultural land to the immediate west and south. To the north and east of the Project site are the Chocolate Mountains, which extend to heights of more than 2,000 feet above mean sea level.

Because of this gradual downward slope from east to west, areas to the north and east of the Project site would be more likely to have views of the Project where not impeded by natural or built features. Viewers in this area are associated with residences and land uses. North of the Project site is agricultural land. Along the eastern edge of the Project site there are two residences and agricultural land. South of the Project site is a mixture of agricultural land and dirt lots used for staging activities. The City of Brawley Wastewater Treatment Plant is located along the western edge of the Project site.

Views in this area are expansive and are generally characterized by sparse development framed by topographical features. Low-profile, weedy plants, such as Quail Brush Scrub and Bush Seepweed, are widespread on undeveloped and unfarmed lands, and ruderal vegetation is along waterways associated with IID canals (Chambers 2021). Individual residences, transmission lines, transportation corridors (including roads and railroads), and agricultural equipment are discernable in the foreground (within 0.25 mile) and middle ground (0.25 to 3-5 miles away) views throughout the area. They are identifiable by their vapor plumes. These views to the west from the Project site are backdropped by the Coyote Mountains and Fish Creek Mountains. Views to the east are backdropped by the Chocolate Mountains.

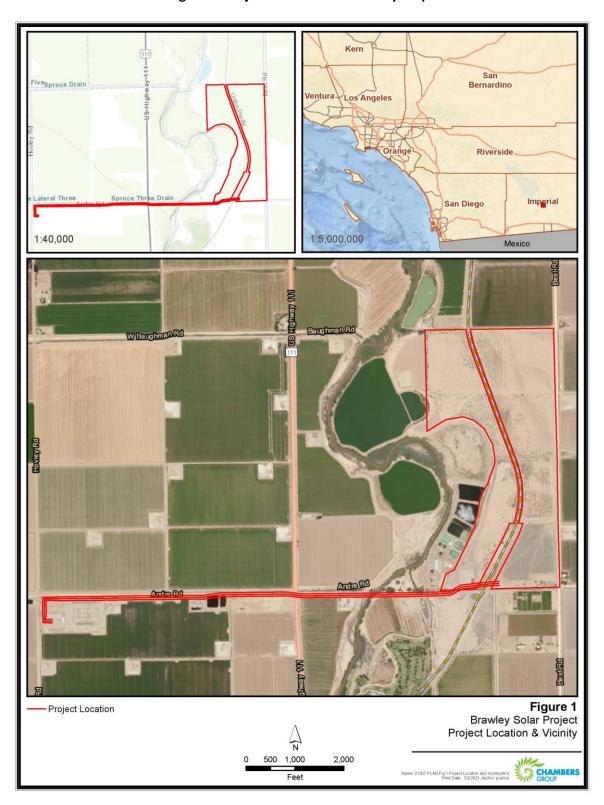


Figure 1: Project Location and Vicinity Map

SECTION 3.0 – METHODOLOGY

A comparison of the Project site's existing conditions and the change to the landscape with implementation of the Project is based on the production of visual simulations. As a part of this process, Chambers Group reviewed aerial imagery to identify where the Project would potentially be visible from visually sensitive areas and selected preliminary viewpoints for site photography. Field surveys were conducted by POWER Engineers, Inc. (POWER) on March 4, 2021 to photo-document existing visual conditions and views toward the Project site. A representative subset of photographed viewpoints was selected as Key Observation Points (KOPs), which collectively serve as the basis for this assessment. This selection was done in coordination with ORNI and the County. Assessments of existing visual conditions were made based on professional judgment that took into consideration sensitive receptors and sensitive viewing areas in the Project area. The locations of the four KOPs in relation to the Project site are presented in Appendix A.

During the field survey, the view from each KOP was photographed using a 35-millimeter, 30-megapixel, full-frame, single lens reflex camera equipped with a 50-millimeter fixed focal length lens. This configuration is the industry accepted standard for approximating the field of vision in a static view of the human eye. The camera positioning was determined with a sub-meter, differentially corrected global positioning system (GPS). The camera was positioned at eye-level for each photograph.

The site photos were used to generate a rendering of the existing conditions and a proposed visualization of the implemented Project. The visual simulations provide clear before-and-after images of the location, scale, and visual appearance of the features affected by and associated with the Project. The simulations were developed through an objective analytical and computer-modeling process and are accurate within the constraints of the available site and alternative data (3-dimensional computer model was created using a combination of AutoCAD files and geographic information system [GIS] layers and exported to Autodesk's 3-dimensional Studio Max for production). Design data — consisting of engineering drawings, elevations, site and topographical contour plans, concept diagrams, and reference pictures — were used as a platform from which digital models were created. In cases where detailed design data were unavailable, more general descriptions about alternative facilities and their locations were used to prepare the digital models.

SECTION 4.0 – DESCRIPTION OF POTENTIAL VISUAL EFFECTS

This section describes views from each KOP, first under existing conditions, and then with the proposed Project simulated. The visual simulations illustrate the location, scale, and conceptual appearance of the Project, as seen from each KOP. These visual simulations allow for comparison of pre-Project and post-Project conditions as discussed qualitatively below. See Figure 1 in Appendix A for KOP locations shown in the Viewpoint Map, as well as existing and simulated images included in Viewpoint 1, 2, 3, and 4.

4.1 VIEW FROM NORTH (N)BEST AVENUE (AVE) (KOP 1)

4.1.1 <u>Existing View</u>

KOP 1 is located along N Best Ave, at the northeast corner of the Project site. The view from KOP 1 is to the southwest, toward the proposed Project's solar arrays (Viewpoint 1). This viewpoint represents views from an identifiable point along the most proximate roadway, where topography allows visibility of the Project site. Additionally, the viewpoint represents the residents located at 5210 N Best Ave in Brawley, CA. The view is characterized by flat agricultural land to the west, south, and east with the nearby residence to the northeast. The Coyote Mountains and Fish Creek Mountains are visible far off to the south. The view of the Project site is mostly unobstructed except for utility poles traveling along the western side of N Best Road.

4.1.2 View with Project

Viewpoint 1 shows the view from KOP 1 with the proposed Project simulated. The solar arrays and the security fencing would be the most prominently visible portion of the Project from this location. As conceptually shown in the simulation, the Project would appear as a comparatively dark, horizontal bar across the majority of the view. The overall effect shown in Viewpoint 1 is the relatively small degree of contrast the Project would have with its broader surroundings, which includes views of the Coyote Mountains and Fish Creek Mountains. Solar arrays would not substantially obscure the mountain skyline from this vantage point.

4.2 VIEW FROM N BEST AVE AND WARD ROAD (KOP 2)

4.2.1 <u>Existing View</u>

KOP 2 is located at the intersection of N Best Ave and Ward Road, at the southeast corner of the Project site. The view from KOP 2 is to the northwest, toward the proposed Project's solar arrays, BESS, and substation (Viewpoint 2). This viewpoint represents views from an identifiable point along the most proximate roadway, where topography allows visibility of the Project site. Additionally, the viewpoint represents the residents located at 5000 N Best Ave and 5002 N Best Road in Brawley, CA. The view is characterized by flat agricultural land to the north; an abandoned residence and fenced corral to the west; a vacant dirt lot to the south; and the nearby residences to the northeast. Vegetation along the New River is visible to the west and the Chocolate Mountains are visible far off to the north and west. The view of the Project site is partially obstructed by vegetation along the old corral and utility poles traveling along the western side of N Best Road.

4.2.2 <u>View with Project</u>

Viewpoint 2 shows the view from KOP 2 with the proposed Project simulated. The solar arrays and the security fencing would be the most prominently visible portion of the Project from this location. With demolition of the abandoned residence and corral, the Project's BESS and substation are also visible from KOP 2 to the west. As conceptually shown in the simulation, the Project would appear as a generally uniform dark line across the view. The overall effect shown in Viewpoint 2 is the relatively small degree of contrast the Project would have with its broader surroundings, which include views of the Chocolate Mountains. The BESS, substation, and solar arrays would not substantially obscure the mountain skyline from this vantage point.

4.3 VIEW FROM NORTH END OF DEL RIO COUNTRY CLUB AND GOLF COURSE (KOP 3)

4.3.1 <u>Existing View</u>

KOP 3 is located along the Union Pacific railroad tracks on the northwest end of Del Rio Country Club and Golf Course, approximately 0.25 mile from the Project site. The view from KOP 3 is to the north, toward the proposed Project's solar arrays, BESS, substation, and gen-tie line. This viewpoint represents golfers and staff at Del Rio Country Club, where topography allows views of the Project site, as well as views from the Union Pacific railway line. The view is characterized by flat, undeveloped land with sparse vegetation to the north and northeast, agricultural land to the east, and the landscaped golf course to the west. The railroad tracks travel north through the middle of the view, with the Chocolate Mountain Range visible far off to the north. The view of the Project site is unobstructed.

4.3.2 <u>View with Project</u>

Viewpoint 3 shows the view from KOP 3 with the proposed Project simulated. The gen-tie structures would be the most prominently visible portion of the Project from this location. As conceptually shown in the simulation, the gen-tie structures would be visible in the center of the view, traveling from east to west approximately 1.75 miles. While appearing as new and highly visible features, the transmission structures would relate to the numerous lines visible throughout the landscape. They would also occupy a relatively narrow portion of the view to the north from KOP 3.

The substation for the proposed Project has not yet been designed. However, the facility shown in Viewpoint 3 is an approximation based on representative examples of substations of similar size and in similar environments. As simulated, the substation would be partially visible in views from KOP 3, alongside the solar arrays, which would appear as a comparatively dark, horizontal bar across a portion of the view's middle ground. Aside from the relatively narrow gen-tie structures, no Project component would substantially obscure or appear above the mountain skyline from this vantage point.

4.4 VIEW FROM STATE ROUTE (SR) 111 AND ANDRE ROAD (KOP 4)

4.4.1 <u>Existing View</u>

KOP 4 is located at the corner of SR 111 and Andre Road, along the gen-tie line route. The view from KOP 4 is to the east, toward the proposed Project's gen-tie line, BESS, substation, and solar arrays. This viewpoint represents views from an identifiable point along a well-traveled roadway in the County, where topography allows visibility of the Project site. The view is characterized by mainly flat agricultural land to

the north and south. The City of Brawley Wastewater Treatment Plant is within the northern portion of the view and a dirt access road leads to an industrial dirt lot with pipelines directly east of the view. The Chocolate Mountain Range is visible far off to the east. The view of the Project site is partially obstructed by the City of Brawley Wastewater Treatment Plant, utility poles, and small amounts of vegetation in the foreground.

4.4.2 View with Project

Viewpoint 4 shows the view from KOP 4 with the proposed Project simulated. The gen-tie structures would be the most prominently visible portion of the Project from this location. As conceptually shown in the simulation, the gen-tie structures would be visible in the southern portion of the view, traveling from east to west approximately 0.5 mile. While appearing as new and highly visible features, the transmission structures would relate to the numerous lines visible throughout the landscape. They would also occupy a relatively narrow portion of the view to the south from KOP 4.

As simulated, views of the substation and BESS would be visible in the distance from KOP 4. These structures would relate to the nearby industrial features in the landscape, including the nearby pipelines. The solar arrays would appear as a comparatively dark, horizontal bar across the remainder of the view. No Project component would substantially obscure or appear above the mountain skyline from this vantage point.

SECTION 5.0 – GLARE ANALYSIS

The Federal Aviation Administration (FAA) has expressed concern for glare resulting from PV systems potentially causing distractions to pilots. For this reason, the FAA has asked solar developers to perform a glare hazard analysis to evaluate and document potential occurrences of glare. Proposed solar operations were studied by POWER Engineers (POWER) for two landing approaches at the Brawley Municipal Airport. In addition to airport operations, POWER analyzed potential glare that would cause distraction to nearby motorists and structures. The Project's Glare Hazard Analysis is included in Appendix B of this document.

As detailed in Appendix B, POWER identified and analyzed the following sensitive viewers for glare:

- Brawley Municipal Airport 2-mile final approaches analyzed at 3% slope
 - Runway 8 Final Approach:
 - Distance from Project: 1.57 miles
 - Heading: 90 degrees true
 - Runway Elevation: -128.88 feet
 - Final Approach Slope: 3.0 degrees
 - o Runway 26 Final Approach:
 - Distance from Project: 1.55 miles
 - Heading: 275 degrees true
 - Runway Elevation: -134.77 feet
 - Final Approach Slope: 3.0 degrees
- Structures Single point analysis was completed for nearby residences and structures.
 - An aerial survey using Google Earth was completed to identify residences/structures within one mile of the project boundary.
 - Distance from Project: Up to one mile
 - Viewer Height: 10 feet above grade
- Major Roadways Roadways were analyzed up to one mile from the project location at a viewer height of 10 feet to account for worse-case scenario truck traffic.
 - N. Best Avenue
 - o Highway 111
 - Ward Road
 - Rutherford Road

POWER used GlareGauge licensed by ForgeSolar. The GlareGauge uses Solar Glare Hazard Analysis Tool technology and is a web-based glare assessment tool allowing input of viewer position, solar facility location, solar technology, and elevation data. The GlareGauge provides a quantified assessment of when and where glare may occur throughout the year from a solar installation, as well as identifying the potential effects on the human eye when glare does occur. Glare was analyzed at one-minute intervals throughout the entire year to determine when and where glare may be visible to residences, motorists, and pilots. The GlareGauge meets FAA glare analysis requirements.

After review of the GlareGauge tool analysis, POWER found no potential glare reported from the proposed solar operations due to the orientation of the PV panels, the 5 degree stow angle and the distance from sensitive viewers to the Project. When the sun is lowest in the sky, nearing sunrise and sunset, the 5 degree stow angle redirects potential glare up and away from sensitive viewers. Based on these findings,

it was concluded that the Brawley Solar Energy Facility Project will have low potential for glare impact on airport operations and will not cause distraction to nearby residences or motorists.

POWER's independent analysis using the GlareGauge concluded the following:

- Brawley Municipal Airport Runways 8 and 26 reported no Glare.
- Structures Nearby residences and structures reported no Glare.
- Motorists Two-way route receptors reported no Glare.

A detailed description of the GlareGauge Analysis Report is in Appendix B.

SECTION 6.0 – PRELIMINARY CEQA ANALYSIS

This technical report will inform the Project's eventual evaluation of potential environmental effects in order to satisfy the California Environmental Quality Act (CEQA). There are four CEQA criteria for Aesthetics. Each is presented here as a question, with preliminary assessments of impact to visual resources provided.

1. Would the Project have a substantial adverse effect on a scenic vista?

Less than Significant Impact. Scenic vistas are typically expansive views from elevated areas. They may or may not be part of a designated scenic overlook or other area providing a static vista view of a landscape. There are no designated scenic vistas in the Project vicinity. According to the County General Plan, the closest scenic resource is the Salton Sea approximately 11 miles northwest of the Project site (County 2015). Views from elevated areas near the Project site could be considered scenic vistas given the expansiveness of the views and distance one can see under favorable conditions. As described above for the view of the Project from all KOPs, the Project would not have a substantial adverse effect on such views. Rather, it would be absorbed into the natural and built features that comprise the existing landscape. Therefore, less than significant impacts to scenic vistas would occur.

2. 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 designated or eligible state scenic highways in the Project vicinity. The nearest road segment among those identified by Imperial County as "having potential as state-designated scenic highways" is the portion of SR 111 from Bombay Beach to the Imperial County/Riverside County boundary. The Project site is approximately 25 miles south of Bombay Beach. Therefore, no impacts to scenic resources within any state scenic highways would occur.

3. 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 existing visual character in views of the Project would not be substantially altered based primarily on the proximity of viewpoints to the Project site. The views from KOPs 1 and 2 show the Project's solar arrays and the security fencing most prominently, which would appear as a comparatively dark, horizontal bar across the view. The overall effect of the Project from these KOPs is relatively small degree of contrast the Project would have with its broader surroundings and a small interruption of views of the surrounding mountains. In the view from KOPs 3 and 4, new transmission structures that would be part of the Project's interconnection would appear large in scale; however, the structures would be comparable in size and appearance to other structures visible throughout the surrounding landscape, including multiple existing transmission lines. As previously described, the Project would not substantially degrade the existing visual character or quality of views from this distance; rather it would appear absorbed into the broader landscape that already includes agricultural development, electricity transmission, geothermal power plants, and the City of Brawley Wastewater Treatment Plant. These effects would be less than significant.

4. Would the Project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Less than Significant Impact. The Project would not include any source of nighttime lighting and therefore would not be a source of substantial light in the area outside of the Project site. POWER produced a Glare Hazard Analysis for the Project (Appendix B). It concluded that sensitive viewers near the Project, including residences, a nearby golf course, major roadways, and approach slopes associated with the Brawley Municipal Airport, would experience no glare effects from the Project. These effects would be less than significant.

SECTION 7.0 – CONCLUSIONS

The Brawley Solar Energy Facility would result in the construction of solar arrays, a substation, a BESS, and a gen-tie line on a currently undeveloped site just east of the SR 111 corridor. In views from publicly accessible locations, the proposed Project would be visible and identifiable, though it would not substantially alter existing visual character (see discussion above). Further, such views of the Project would be limited in duration for drivers along SR 111. In most views, much or all of the Project would be absorbed into the broader landscape. The majority of this portion of the Imperial Valley is dedicated to agricultural and power production and transmission. The Project would appear consistent with existing patterns of croplands, geothermal facilities, utility infrastructure, and other mechanized or industrial-appearing development.

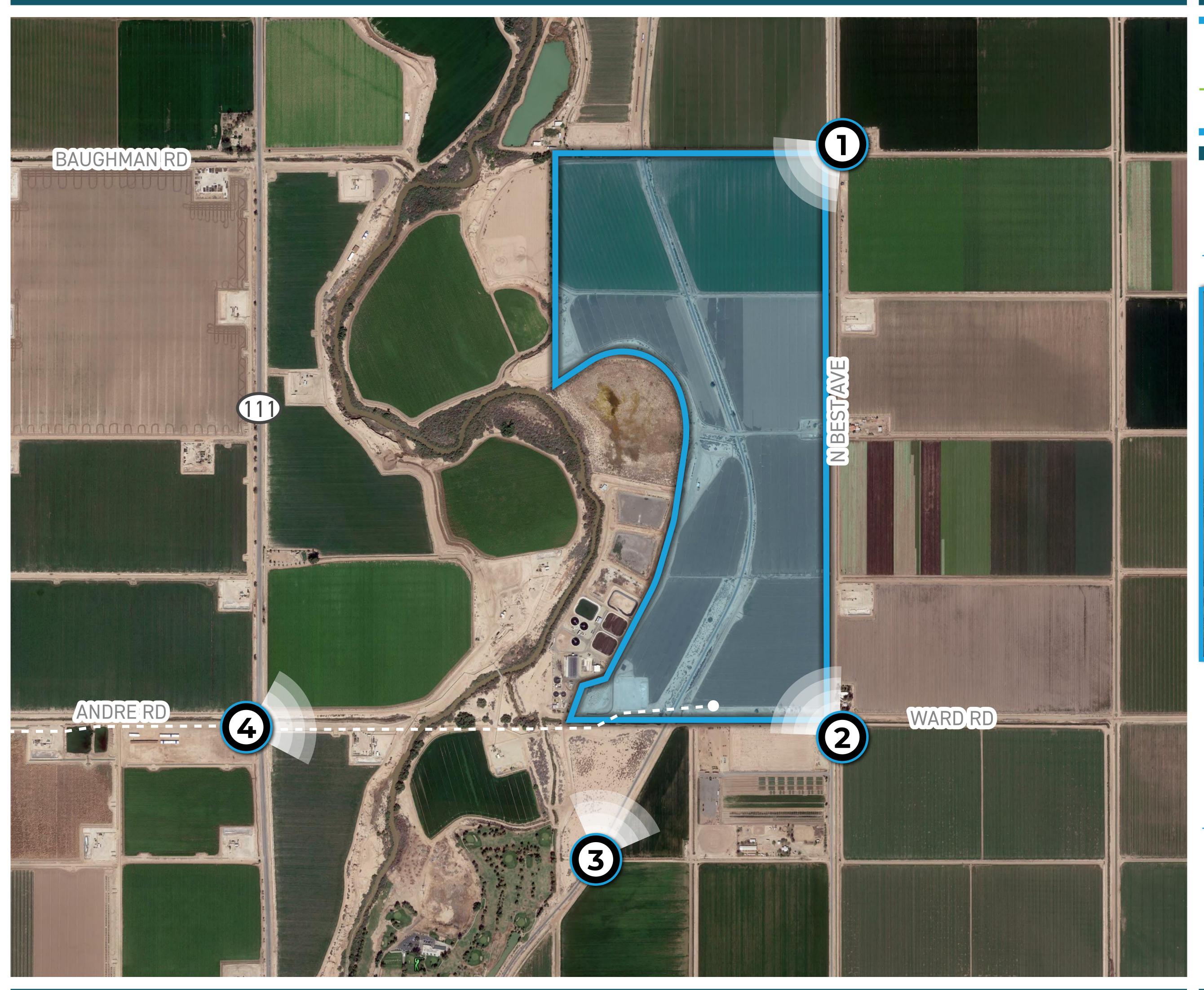
SECTION 8.0 – REFERENCES

Chambers Group, Inc. (Chambers)

2021 Biological Technical Report for the Brawley Solar Project.

County of Imperial (County)

2008 Imperial County General Plan – Circulation and Scenic Highways Element. Available online: https://www.icpds.com/assets/planning/circulation-scenic-highway-element-2008.pdf



BRAWLEY SOLAR — ENERGY FACILITY —

VIEWPOINT MAP



- 1 PHOTO VIEWPOINT
- LARGE MAP VIEW-AREA
- PROJECT AREA



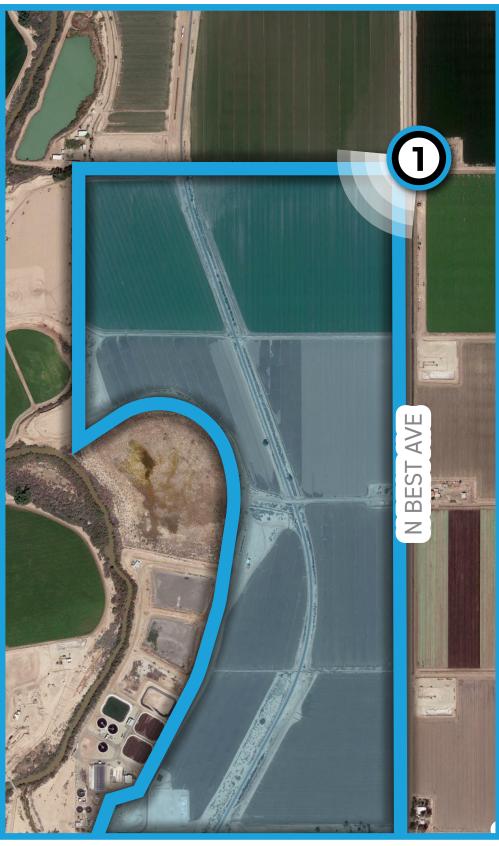




DATE: 03/04/2021

TIME: 1:46 PM

DIRECTION: SOUTHWEST





1 PHOTO VIEWPOINT



PROJECT AREA









DATE: 03/04/2021

TIME: 1:17 PM

DIRECTION: NORTHWEST











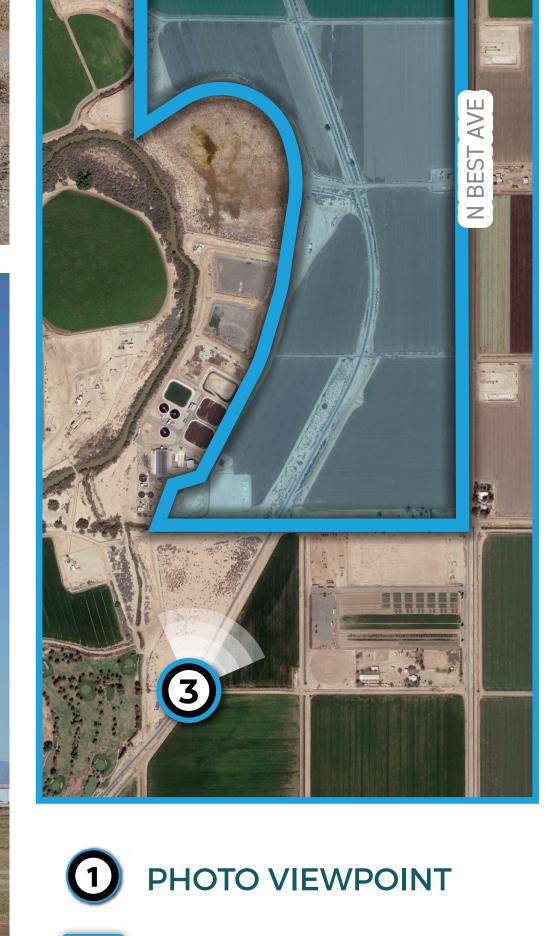




DATE: 03/04/2021

TIME: 1:23 PM

DIRECTION: NORTH





PROJECT AREA





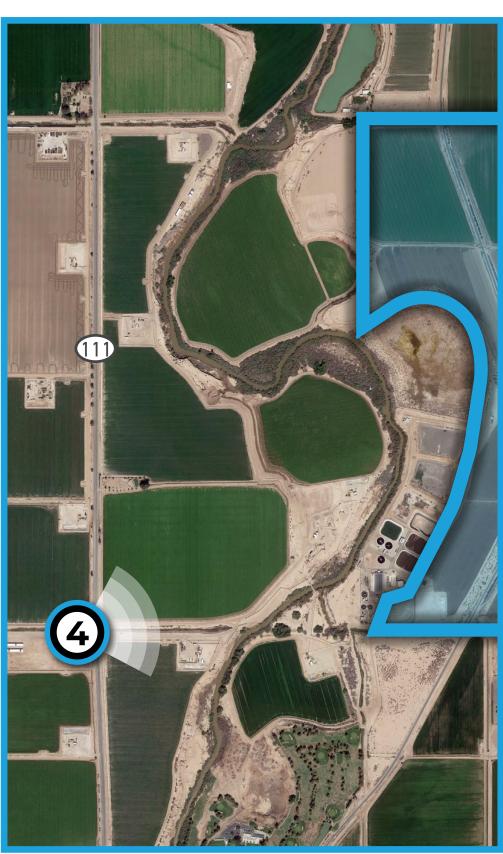




DATE: 03/04/2021

TIME: 2:05 PM

DIRECTION: EAST







PROJECT AREA







PHONE 208-288-6100 **FAX** 208-288-6199

April 26, 2021

Victoria Boyd Chambers Group 5 Hutton Center Drive Suite 750 Santa Ana, CA 92707

Subject: Glare analysis for the Brawley Solar Energy Facility in Brawley, Imperial County, California

Dear Ms. Boyd:

At your request, POWER Engineers Inc. (POWER) has evaluated the proposed Brawley Solar Energy Facility (Project) to ensure Federal Aviation Administration (FAA) compliance regarding hazardous solar glare in or around airports. POWER has also evaluated any potential glare that could cause distraction to nearby structures and motorists. This technical memo describes our findings.

Project Description – The proposed Project located in Brawley, California and will utilize single-axis tracking photovoltaic solar technology and produce up to 40 megawatts (MW) of energy (See Appendix A). This Glare Study was commissioned by Chambers Group and prepared for Imperial County, Brawley Municipal Airport officials and the FAA. Specifically, this study does the following:

- Identifies any sensitive viewers near the Project including residences, other structures, a
 nearby golf course, major roadways and approach slopes associated with the Brawley
 Municipal Airport.
- Characterizes typical glare behavior experienced from the solar project throughout the day and year.
- Evaluates when and where glare may be visible to structures, motorists and pilots on final approach.

Sensitive Viewers – The FAA has expressed concern for glare resulting from PV systems potentially causing distractions to pilots. For this reason, the FAA has asked solar developers to perform a glare hazard analysis to evaluate and document potential occurrences of glare. Proposed solar operations were studied for two landing approaches at the Brawley Municipal Airport. In addition to airport operations, POWER analyzed potential glare that would cause distraction to nearby motorists and structures (See Appendix A). POWER identified and analyzed the following sensitive viewers:

- **Brawley Municipal Airport** 2-mile final approaches analyzed at 3% slope
 - o Runway 8 Final Approach:

Distance from Project: 1.57 miles

Heading: 90 degrees true

■ Runway Elevation: -128.88 feet

• Final Approach Slope: 3.0 degrees

Runway 26 Final Approach:

Distance from Project: 1.55 miles

Heading: 275 degrees true

Runway Elevation: -134.77 feet

Final Approach Slope: 3.0 degrees

- Structures Single point analysis was completed for nearby residences and structures.
 - An aerial survey using Google Earth was completed to identify residences/structures within one mile of the project boundary.
 - o Distance from Project: Up to one mile
 - Viewer Height: 10 feet above grade
- **Major Roadways** Roadways were analyzed up to one mile from the project location at a viewer height of 10 feet to account for worse-case scenario truck traffic.
 - o N. Best Avenue
 - o Highway 111
 - Ward Road
 - o Rutherford Road

Solar Technology – The Project proposes the use of single-axis tracking PV panels rotating around a north/south axis. Single-axis trackers are designed to maximize solar efficiency by tracking the east-west position of the sun throughout the day. Panels will utilize back-tracking after reaching the maximum tracking angle to reduce shading of adjacent panels (See Appendix B). Details of the solar technologies were provided by the Chambers Group and are described below:

Tracking: Single-axis Tracking

Tracking Axis Orientation: 180 due south

Maximum Tracking Angle: ± 52 Degrees

Stow Angle: ± 5 Degrees

o Coating/Texture: Smooth glass with anti-reflective (AR) coating

o Mount Height: 5 feet above grade

Glare Analysis – POWER used GlareGauge licensed by ForgeSolar. The GlareGauge uses Solar Glare Hazard Analysis Tool technology and is a web-based glare assessment tool allowing input of viewer position, solar facility location, solar technology, and elevation data. The GlareGauge provides a quantified assessment of when and where glare may occur throughout the year from a solar installation, as well as identifying the potential effects on the human eye when glare does occur. Glare was analyzed at one-minute intervals throughout the entire year to determine when and where glare may be visible to residences, motorists, and pilots. The GlareGauge meets FAA glare analysis requirements.

Results – After review of the Glare Gauge tool analysis, POWER found no potential glare reported from the proposed solar operations due to the orientation of the PV panels, the 5 degree stow angle and the distance from sensitive viewers to the Project. When the sun is lowest in the sky, nearing sunrise and sunset, the 5 degree stow angle redirects potential glare up and away from sensitive viewers. Based on these findings, it is POWER's professional opinion that the proposed Brawley Solar Energy Facility Project will have low potential for glare impact on airport operations and will not cause distraction to nearby residences or motorists.

POWER's independent analysis using the GlareGauge concluded the following:

- Brawley Municipal Airport Runways 8 and 26 reported no Glare.
- Structures Nearby residences and structures reported no Glare.
- Motorists Two-way route receptors reported no Glare.

For a detailed description of the GlareGauge analysis report please see Appendices C.

Please let me know if you have any questions as I would be happy to discuss.

Sincerely,

Visualization Specialist III

Enclosure: Appendix A – Project Location

Appendix B - Solar Behavior

Appendix C – GlareGauge output glare analysis

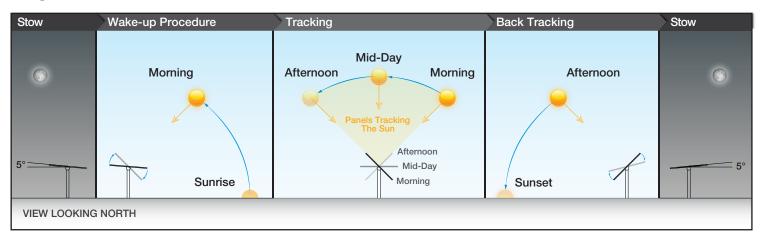
APPENDIX A PROJECT LOCATION



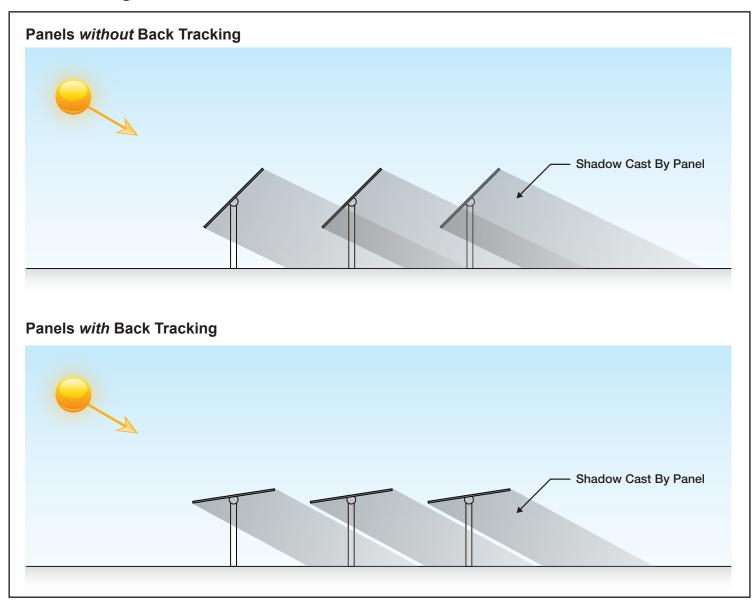


APPENDIX B SOLAR BEHAVIOR

Single Axis Tracker Behavior



Back Tracking Procedures





APPENDIX C GLAREGAUGE OUTPUT GLARE ANALYSIS



FORGESOLAR GLARE ANALYSIS

Project: Brawley Solar

Site configuration: Brawley PV

Analysis conducted by Andy Stephens (andy.stephens@powereng.com) at 22:23 on 19 Apr, 2021.

U.S. FAA 2013 Policy Adherence

The following table summarizes the policy adherence of the glare analysis based on the 2013 U.S. Federal Aviation Administration Interim Policy 78 FR 63276. This policy requires the following criteria be met for solar energy systems on airport property:

- · No "yellow" glare (potential for after-image) for any flight path from threshold to 2 miles
- No glare of any kind for Air Traffic Control Tower(s) ("ATCT") at cab height.
- · Default analysis and observer characteristics (see list below)

ForgeSolar does not represent or speak officially for the FAA and cannot approve or deny projects. Results are informational only.

COMPONENT	STATUS	DESCRIPTION
Analysis parameters	PASS	Analysis time interval and eye characteristics used are acceptable
2-mile flight path(s)	PASS	Flight path receptor(s) do not receive yellow glare
ATCT(s)	N/A	No ATCT receptors designated

Default glare analysis parameters and observer eye characteristics (for reference only):

Analysis time interval: 1 minuteOcular transmission coefficient: 0.5

Pupil diameter: 0.002 meters
Eye focal length: 0.017 meters
Sun subtended angle: 9.3 milliradians

FAA Policy 78 FR 63276 can be read at https://www.federalregister.gov/d/2013-24729

SITE CONFIGURATION

Analysis Parameters

DNI: peaks at 1,000.0 W/m^2

Time interval: 1 min Ocular transmission coefficient: 0.5

Pupil diameter: 0.002 m Eye focal length: 0.017 m Sun subtended angle: 9.3

mrad

Site Config ID: 52670.9444



PV Array(s)

Name: PV array 1

Axis tracking: Single-axis rotation

Tracking axis orientation: 180.0°

Tracking axis tilt: 0.0°

Tracking axis panel offset: 0.0° Max tracking angle: 52.0° Resting angle: 5.0°

Rated power: -

Panel material: Smooth glass with AR coating

Reflectivity: Vary with sun



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	33.029958	-115.517802	-150.79	5.00	-145.79
2	33.029922	-115.515249	-148.76	5.00	-143.76
3	33.026522	-115.513876	-145.70	5.00	-140.70
4	33.026540	-115.517910	-151.93	5.00	-146.93

Axis tracking: Single-axis rotation

Tracking axis orientation: 180.0°

Tracking axis tilt: 0.0°

Tracking axis panel offset: 0.0° Max tracking angle: 52.0° Resting angle: 5.0°

Rated power: -

Panel material: Smooth glass with AR coating

Reflectivity: Vary with sun

Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	33.029940	-115.514949	-147.15	5.00	-142.15
2	33.029976	-115.509520	-145.94	5.00	-140.94
3	33.026540	-115.509477	-144.50	5.00	-139.50
4	33.026540	-115.513425	-145.34	5.00	-140.34

Name: PV array 3

Axis tracking: Single-axis rotation Tracking axis orientation: 180.0°

Tracking axis tilt: 0.0°

Tracking axis panel offset: 0.0° Max tracking angle: 52.0° Resting angle: 5.0°

Rated power: -

Panel material: Smooth glass with AR coating

Reflectivity: Vary with sun



Vertex Latitude (°) Longitude (°) Ground elevation (ft) Height above ground (ft) Total elevation 1 33.026414 -115.517717 -159.64 5.00 -154.64 2 33.026414 -115.513811 -145.48 5.00 -140.48 3 33.022933 -115.512341 -144.59 5.00 -139.59 4 33.022951 -115.513296 -147.35 5.00 -142.35 5 33.024273 -115.513747 -143.95 5.00 -138.95 6 33.025119 -115.515142 -149.87 5.00 -144.87 7 33.025119 -115.517759 -147.43 5.00 -142.43						
2 33.026414 -115.513811 -145.48 5.00 -140.48 3 33.022933 -115.512341 -144.59 5.00 -139.59 4 33.022951 -115.513296 -147.35 5.00 -142.35 5 33.024273 -115.513747 -143.95 5.00 -138.95 6 33.025119 -115.515142 -149.87 5.00 -144.87	Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
3 33.022933 -115.512341 -144.59 5.00 -139.59 4 33.022951 -115.513296 -147.35 5.00 -142.35 5 33.024273 -115.513747 -143.95 5.00 -138.95 6 33.025119 -115.515142 -149.87 5.00 -144.87	1	33.026414	-115.517717	-159.64	5.00	-154.64
4 33.022951 -115.513296 -147.35 5.00 -142.35 5 33.024273 -115.513747 -143.95 5.00 -138.95 6 33.025119 -115.515142 -149.87 5.00 -144.87	2	33.026414	-115.513811	-145.48	5.00	-140.48
5 33.024273 -115.513747 -143.95 5.00 -138.95 6 33.025119 -115.515142 -149.87 5.00 -144.87	3	33.022933	-115.512341	-144.59	5.00	-139.59
6 33.025119 -115.515142 -149.87 5.00 -144.87	4	33.022951	-115.513296	-147.35	5.00	-142.35
	5	33.024273	-115.513747	-143.95	5.00	-138.95
7 33.025119 -115.517759 -147.43 5.00 -142.43	6	33.025119	-115.515142	-149.87	5.00	-144.87
	7	33.025119	-115.517759	-147.43	5.00	-142.43

Axis tracking: Single-axis rotation

Tracking axis orientation: 180.0°

Tracking axis tilt: 0.0°

Tracking axis panel offset: 0.0° Max tracking angle: 52.0° Resting angle: 5.0°

Rated power: -

Panel material: Smooth glass with AR coating

Reflectivity: Vary with sun

Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	33.026378	-115.513361	-146.34	5.00	-141.34
2	33.026396	-115.509477	-144.66	5.00	-139.66
3	33.022942	-115.509498	-143.54	5.00	-138.54
4	33.022906	-115.512030	-144.23	5.00	-139.23

Name: PV array 5

Axis tracking: Single-axis rotation Tracking axis orientation: 180.0°

Tracking axis tilt: 0.0°

Tracking axis panel offset: 0.0° Max tracking angle: 52.0° Resting angle: 5.0°

Rated power: -

Panel material: Smooth glass with AR coating

Reflectivity: Vary with sun



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	33.022861	-115.513328	-148.32	5.00	-143.32
2	33.022834	-115.512331	-144.08	5.00	-139.08
3	33.021593	-115.511912	-146.10	5.00	-141.10
4	33.020279	-115.511891	-146.57	5.00	-141.57
5	33.019227	-115.512202	-144.98	5.00	-139.98
6	33.019236	-115.514401	-147.82	5.00	-142.82

Axis tracking: Single-axis rotation

Tracking axis orientation: 180.0°

Tracking axis tilt: 0.0°

Tracking axis panel offset: 0.0° Max tracking angle: 52.0° Resting angle: 5.0°

Rated power: -

Panel material: Smooth glass with AR coating

Reflectivity: Vary with sun

Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	33.022816	-115.511987	-144.06	5.00	-139.06
2	33.022834	-115.509509	-142.79	5.00	-137.79
3	33.019236	-115.509498	-143.10	5.00	-138.10
4	33.019245	-115.511869	-145.02	5.00	-140.02
5	33.020225	-115.511644	-146.05	5.00	-141.05
6	33.021691	-115.511644	-146.73	5.00	-141.73

Name: PV array 7

Axis tracking: Single-axis rotation Tracking axis orientation: 180.0°

Tracking axis tilt: 0.0°

Tracking axis panel offset: 0.0° Max tracking angle: 52.0° Resting angle: 5.0°

Rated power: -

Panel material: Smooth glass with AR coating

Reflectivity: Vary with sun



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	33.019173	-115.514434	-148.52	5.00	-143.52
2	33.019155	-115.512223	-144.95	5.00	-139.95
3	33.016609	-115.513811	-145.07	5.00	-140.07
4	33.016591	-115.516097	-146.79	5.00	-141.79

Axis tracking: Single-axis rotation

Tracking axis orientation: 180.0°

Tracking axis tilt: 0.0°

Tracking axis panel offset: 0.0° Max tracking angle: 52.0° Resting angle: 5.0°

Rated power: -

Panel material: Smooth glass with AR coating

Reflectivity: Vary with sun

Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	33.019119	-115.511966	-144.60	5.00	-139.60
2	33.019146	-115.509509	-143.18	5.00	-138.18
3	33.015790	-115.509498	-140.29	5.00	-135.29
4	33.015763	-115.513929	-144.40	5.00	-139.40

Flight Path Receptor(s)

Name: FP 26 Description:

Threshold height: 50 ft Direction: 270.0° Glide slope: 3.0°

Pilot view restricted? Yes Vertical view: 30.0° Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	32.992949	-115.511036	-134.19	50.00	-84.19
Two-mile	32.992954	-115.476524	-139.45	608.72	469.27

Name: FP 8
Description:

Threshold height: 50 ft Direction: 90.0° Glide slope: 3.0°

Pilot view restricted? Yes Vertical view: 30.0° Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	32.992931	-115.522773	-128.04	50.00	-78.04
Two-mile	32.992931	-115.557285	-119.14	594.56	475.42

Discrete Observation Receptors

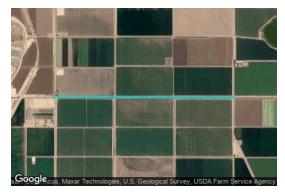
Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 1	1	33.030343	-115.508550	-144.90	10.00
OP 2	2	33.023028	-115.508671	-141.97	10.00
OP 3	3	33.015918	-115.508889	-141.68	10.00
OP 4	4	33.016206	-115.508985	-136.22	10.00
OP 5	5	33.012222	-115.510718	-132.70	10.00
OP 6	6	33.016879	-115.516500	-165.03	10.00
OP 7	7	33.019725	-115.525648	-140.27	10.00
OP 8	8	33.030390	-115.527614	-144.83	10.00
OP 9	9	33.001207	-115.508821	-129.38	10.00
OP 10	10	33.019487	-115.483043	-137.60	10.00
OP 11	11	33.030237	-115.517849	-149.57	10.00
OP 12	12	33.009611	-115.521644	-130.02	10.00

Route Receptor(s)

Name: Route 2
Path type: Two-way

Observer view angle: 50.0°

Note: Route receptors are excluded from this FAA policy review. Use the 2-mile flight path receptor to simulate flight paths according to FAA guidelines.



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	33.015524	-115.483415	-138.71	10.00	-128.71
2	33.015615	-115.509284	-142.13	10.00	-132.13

Name: Route 3
Path type: Two-way
Observer view angle: 50.0°

Note: Route receptors are excluded from this FAA policy review. Use the 2-mile flight path receptor to simulate flight paths according to FAA guidelines.



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	33.044565	-115.527346	-161.18	10.00	-151.18
2	33.043630	-115.527389	-159.66	10.00	-149.66
3	33.043018	-115.527303	-157.99	10.00	-147.99
4	33.041831	-115.526981	-158.52	10.00	-148.51
5	33.040860	-115.526917	-156.83	10.00	-146.83
6	33.027924	-115.526836	-149.21	10.00	-139.21
7	33.015671	-115.526847	-142.44	10.00	-132.44
8	33.010274	-115.526584	-138.38	10.00	-128.38
9	33.007710	-115.526552	-148.29	10.00	-138.29
10	33.004426	-115.526509	-165.15	10.00	-155.15
11	33.000994	-115.526430	-133.10	10.00	-123.10
12	32.999906	-115.526452	-132.98	10.00	-122.98

Name: Route 4
Path type: Two-way
Observer view angle: 50.0°

Note: Route receptors are excluded from this FAA policy review. Use the 2-mile flight path receptor to simulate flight paths according to FAA guidelines.



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	33.044574	-115.527519	-160.65	10.00	-150.64
2	33.044485	-115.521446	-164.99	10.00	-154.99
3	33.044485	-115.509001	-151.38	10.00	-141.37
4	33.044507	-115.501104	-149.43	10.00	-139.43
5	33.044579	-115.500171	-150.41	10.00	-140.41
6	33.044603	-115.479221	-146.50	10.00	-136.50

Name: Route 4
Path type: Two-way

Observer view angle: 50.0°

Note: Route receptors are excluded from this FAA policy review. Use the 2-mile flight path receptor to simulate flight paths according to FAA guidelines.



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	33.044443	-115.509272	-151.53	10.00	-141.53
2	33.039923	-115.509262	-150.45	10.00	-140.45
3	33.030728	-115.509247	-148.05	10.00	-138.05
4	33.026435	-115.509240	-145.11	10.00	-135.11
5	33.022358	-115.509239	-143.95	10.00	-133.95
6	33.016137	-115.509232	-139.34	10.00	-129.34
7	33.015714	-115.509248	-140.20	10.00	-130.20
8	33.015294	-115.509293	-141.75	10.00	-131.75
9	33.001013	-115.509288	-133.83	10.00	-123.83
10	33.000860	-115.509293	-136.04	10.00	-126.04

GLARE ANALYSIS RESULTS

Summary of Glare

PV Array Name	Tilt	Orient	"Green" Glare	"Yellow" Glare	Energy
	(°)	(°)	min	min	kWh
PV array 1	SA tracking	SA tracking	0	0	-
PV array 2	SA tracking	SA tracking	0	0	-
PV array 3	SA tracking	SA tracking	0	0	-
PV array 4	SA tracking	SA tracking	0	0	-
PV array 5	SA tracking	SA tracking	0	0	-
PV array 6	SA tracking	SA tracking	0	0	-
PV array 7	SA tracking	SA tracking	0	0	-
PV array 8	SA tracking	SA tracking	0	0	-

Total annual glare received by each receptor

Receptor	Annual Green Glare (min)	Annual Yellow Glare (min)
FP 26	0	0
FP 8	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0

Receptor	Annual Green Glare (min)	Annual Yellow Glare (min)
Route 2	0	0
Route 3	0	0
Route 4	0	0
Route 4	0	0

Results for: PV array 1

Receptor	Green Glare (min)	Yellow Glare (min)
FP 26	0	0
FP 8	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
Route 2	0	0
Route 3	0	0
Route 4	0	0
Route 4	0	0

Flight Path: FP 26

0 minutes of yellow glare 0 minutes of green glare

Flight Path: FP 8

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare0 minutes of green glare

Point Receptor: OP 3

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare0 minutes of green glare

Point Receptor: OP 9

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare 0 minutes of green glare

Route: Route 2

0 minutes of yellow glare 0 minutes of green glare

Route: Route 3

0 minutes of yellow glare 0 minutes of green glare

Route: Route 4

0 minutes of yellow glare 0 minutes of green glare

Route: Route 4

0 minutes of yellow glare 0 minutes of green glare

Results for: PV array 2

Receptor	Green Glare (min)	Yellow Glare (min)
FP 26	0	0
FP 8	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0

Receptor	Green Glare (min)	Yellow Glare (min)
Route 2	0	0
Route 3	0	0
Route 4	0	0
Route 4	0	0

Flight Path: FP 26

0 minutes of yellow glare 0 minutes of green glare

Flight Path: FP 8

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 3

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 9

0 minutes of yellow glare0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 12

0 minutes of yellow glare 0 minutes of green glare

Route: Route 2

0 minutes of yellow glare0 minutes of green glare

Route: Route 3

0 minutes of yellow glare 0 minutes of green glare

Route: Route 4

0 minutes of yellow glare 0 minutes of green glare

Route: Route 4

Results for: PV array 3

Receptor	Green Glare (min)	Yellow Glare (min)
FP 26	0	0
FP 8	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
Route 2	0	0
Route 3	0	0
Route 4	0	0
Route 4	0	0

Flight Path: FP 26

0 minutes of yellow glare 0 minutes of green glare

Flight Path: FP 8

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 9

0 minutes of yellow glare0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 12

Route: Route 2

0 minutes of yellow glare 0 minutes of green glare

Route: Route 3

0 minutes of yellow glare 0 minutes of green glare

Route: Route 4

0 minutes of yellow glare 0 minutes of green glare

Route: Route 4

0 minutes of yellow glare 0 minutes of green glare

Results for: PV array 4

Receptor	Green Glare (min)	Yellow Glare (min)
FP 26	0	0
FP 8	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
Route 2	0	0
Route 3	0	0
Route 4	0	0
Route 4	0	0

Flight Path: FP 26

0 minutes of yellow glare0 minutes of green glare

Flight Path: FP 8

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 3

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 12

0 minutes of yellow glare 0 minutes of green glare

Route: Route 2

0 minutes of yellow glare 0 minutes of green glare

Route: Route 3

0 minutes of yellow glare0 minutes of green glare

Route: Route 4

0 minutes of yellow glare 0 minutes of green glare

Route: Route 4

Results for: PV array 5

Green Glare (min)	Yellow Glare (min)
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0

Flight Path: FP 26

0 minutes of yellow glare 0 minutes of green glare

Flight Path: FP 8

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 9

0 minutes of yellow glare0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 12

Route: Route 2

0 minutes of yellow glare 0 minutes of green glare

Route: Route 3

0 minutes of yellow glare 0 minutes of green glare

Route: Route 4

0 minutes of yellow glare 0 minutes of green glare

Route: Route 4

0 minutes of yellow glare 0 minutes of green glare

Results for: PV array 6

Receptor	Green Glare (min)	Yellow Glare (min)
FP 26	0	0
FP 8	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
Route 2	0	0
Route 3	0	0
Route 4	0	0
Route 4	0	0

Flight Path: FP 26

0 minutes of yellow glare0 minutes of green glare

Flight Path: FP 8

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 3

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 12

0 minutes of yellow glare 0 minutes of green glare

Route: Route 2

0 minutes of yellow glare 0 minutes of green glare

Route: Route 3

0 minutes of yellow glare0 minutes of green glare

Route: Route 4

0 minutes of yellow glare 0 minutes of green glare

Route: Route 4

Results for: PV array 7

Receptor	Green Glare (min)	Yellow Glare (min)
FP 26	0	0
FP 8	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
Route 2	0	0
Route 3	0	0
Route 4	0	0
Route 4	0	0

Flight Path: FP 26

0 minutes of yellow glare 0 minutes of green glare

Flight Path: FP 8

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 9

0 minutes of yellow glare0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 12

Route: Route 2

0 minutes of yellow glare 0 minutes of green glare

Route: Route 3

0 minutes of yellow glare 0 minutes of green glare

Route: Route 4

0 minutes of yellow glare 0 minutes of green glare

Route: Route 4

0 minutes of yellow glare 0 minutes of green glare

Results for: PV array 8

Receptor	Green Glare (min)	Yellow Glare (min)
FP 26	0	0
FP 8	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
Route 2	0	0
Route 3	0	0
Route 4	0	0
Route 4	0	0

Flight Path: FP 26

0 minutes of yellow glare0 minutes of green glare

Flight Path: FP 8

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 3

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare 0 minutes of green glare

Point Receptor: OP 12

0 minutes of yellow glare 0 minutes of green glare

Route: Route 2

0 minutes of yellow glare 0 minutes of green glare

Route: Route 3

0 minutes of yellow glare0 minutes of green glare

Route: Route 4

0 minutes of yellow glare 0 minutes of green glare

Route: Route 4

Assumptions

point on related limitations.)

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.

Glare analyses do not account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographic obstructions.

Several calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.

The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous

Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.

Glare vector plots are simplified representations of analysis data. Actual glare emanations and results may differ.

The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual results and glare occurrence may differ.

Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.

Refer to the Help page at www.forgesolar.com/help/ for assumptions and limitations not listed here.

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AIR QUALITY, ENERGY, AND GREENHOUSE GAS EMISSIONS IMPACT ANALYSIS

BRAWLEY SOLAR ENERGY FACILITY PROJECT

IMPERIAL COUNTY

Lead Agency:

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Project No. 21014

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ACRONYMS AND ABBREVIATIONS

AB Assembly Bill

Air Basin Salton Sea Air Basin

AQMP Air Quality Management Plan

BACT Best Available Control Technology

BSFC Brake Specific Fuel Consumption

CAAQS California Ambient Air Quality Standards

CalEEMod California Emissions Estimator Model

CalEPA California Environmental Protection Agency

CAPCOA California Air Pollution Control Officers Association

CARB California Air Resources Board
CEC California Energy Commission

CEQA California Environmental Quality Act

CFCs chlorofluorocarbons Cf_4 tetrafluoromethane C_2F_6 hexafluoroethane

CH₄ Methane

CO Carbon monoxide

CO₂ Carbon dioxide

CO₂e Carbon dioxide equivalent

County County of Imperial

DPM Diesel particulate matter

EPA Environmental Protection Agency

ºF Fahrenheit

FTIP Federal Transportation Improvement Program

GHG Greenhouse gas

GWP Global warming potential
HAP Hazardous Air Pollutants

HFCs Hydrofluorocarbons

ICAPCD Imperial County Air Pollution Control District

IPCC International Panel on Climate Change

kWhr kilowatt-hour

LCFS Low Carbon Fuel Standard

LST Localized Significant Thresholds

MATES Multiple Air Toxics Exposure Study

MMTCO₂e Million metric tons of carbon dioxide equivalent

MPO Metropolitan Planning Organization

MWh Megawatt-hour

NAAQS National Ambient Air Quality Standards

NO_x Nitrogen oxides NO₂ Nitrogen dioxide

OPR Office of Planning and Research

Pfc Perfluorocarbons
PM Particle matter

PM10 Particles that are less than 10 micrometers in diameter

PM2.5 Particles that are less than 2.5 micrometers in diameter

PPM Parts per million
PPB Parts per billion
PPT Parts per trillion

RTIP Regional Transportation Improvement Plan

RTP/SCS Regional Transportation Plan/Sustainable Communities Strategy

SB Senate Bill

SCAQMD South Coast Air Quality Management District

SCAG Southern California Association of Governments

SF₆ Sulfur Hexafluoride

SIP State Implementation Plan

SO_x Sulfur oxides

TAC Toxic air contaminants

UNFCCC United Nations' Framework Convention on Climate Change

VOC Volatile organic compounds

1.0 INTRODUCTION

1.1 Purpose of Analysis and Study Objectives

This Air Quality, Energy, and Greenhouse Gas (GHG) Emissions Impact Analysis has been completed to determine the air quality, energy, and GHG emissions impacts associated with the proposed Brawley Solar Energy Facility project (proposed project). The following is provided in this report:

- A description of the proposed project;
- A description of the atmospheric setting;
- A description of the criteria pollutants and GHGs;
- A description of the air quality regulatory framework;
- A description of the energy conservation regulatory framework;
- A description of the GHG emissions regulatory framework;
- A description of the air quality, energy, and GHG emissions thresholds including the California Environmental Quality Act (CEQA) significance thresholds;
- An analysis of the conformity of the proposed project with the South Coast Air Quality Management District (SCAQMD) Air Quality Management Plan (AQMP);
- An analysis of the short-term construction related and long-term operational air quality, energy, and GHG emissions impacts; and
- An analysis of the conformity of the proposed project with all applicable energy and GHG emissions reduction plans and policies.

1.2 Site Locations and Study Area

The project site is located in the County of Imperial (County). The approximately 227-acre project site is currently alfalfa fields within different levels of harvest and is bounded by undeveloped agricultural land to the north and to the east, undeveloped agricultural land and dirt lots used for staging actives to the south, and City of Brawley Wastewater Treatment Plan to the west. The project local study area is shown in Figure 1.

Sensitive Receptors in Project Vicinity

The nearest sensitive receptors to the project site are single-family homes located as near as 40 feet to the north side of the project site (near the northwest corner of the project site). The nearest school is Brawley Union High School and Desert Valley High School, which is located as near as 2.7 miles south of the project site and Barbara Worth Junior High School, which is located as near as 2.8 miles south of the project site.

1.3 Proposed Project Description

The proposed project would consist of development of solar energy facility located at 5003 Best Ave, Brawley. The Brawley solar energy facility includes a 40 Megawatt (MW)/160 Megawatt hour (MWh) photovoltaic (PV) solar farm and 40 MW/160 MWh battery energy storage system (BESS). Power generated by the proposed project would be low voltage direct current (DC) power that would be

collected and routed to a series of inverters and their associated pad-mounted transformers. The inverters would convert the DC power generated by the panels to alternating current (AC) power and the pad mounted transformers would step up the voltage. The Project would connect to the North Brawley Geothermal Power Plant substation southwest of the Project site via an approximately 1.6-mile-long aboveground 92 kilovolt (kV) generation tie line (gen-tie line). Energy generated and stored by the project will be sold to the wholesale market or retail electric providers in furtherance of the goals of the California Renewable Energy Portfolio Standards and other similar renewable programs in the Pacific Southwest power market. The proposed site plan is shown in Figure 2.

1.4 Executive Summary

Standard Air Quality, Energy, and GHG Regulatory Conditions

The proposed project will be required to comply with the following regulatory conditions from the ICAPCD and State of California (State).

<u>Imperial County Air Pollution Control District Regulations</u>

The following lists the ICAPCD regulations are applicable, but not limited to the proposed project.

- Regulation II Permits Requires all stationary emissions sources to obtain a permit from ICAPCD;
- Regulation VIII Provides specific rules for the control of fugitive dust.

State of California Rules

The following lists the State of California Code of Regulations (CCR) air quality emission rules that are applicable, but not limited to the proposed project.

- CCR Title 13, Article 4.8, Chapter 9, Section 2449 In use Off-Road Diesel Vehicles;
- CCR Title 13, Section 2025 On-Road Diesel Truck Fleets; and
- CCR Title 24 Part 11 California Green Building Standards.

Summary of Analysis Results

The following is a summary of the proposed project's impacts with regard to the State CEQA Guidelines air quality, energy, and GHG emissions checklist questions.

Conflict with or obstruct implementation of the applicable air quality plan?

Less than significant impact.

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?

Less than significant impact.

Expose sensitive receptors to substantial pollutant concentrations?

Less than significant impact.

Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Less than significant impact.

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.

Conflict with or obstruct a state or local plan for renewable energy;

Less than significant impact.

<u>Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?</u>

No impact.

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

No impact.

1.5 Project Design Features Incorporated into the Proposed Project

This analysis was based on implementation of the following project design features from the *CEQA Air Quality Handbook* (ICAPCD CEQA Handbook), prepared by ICAPCD, December 12, 2017, that all industrial projects in the County are required to implement.

Project Design Feature 1:

The project applicant shall require the following measures to be implemented during construction of the project:

Fugitive Dust Control

- a. All disturbed areas, including Bulk Material storage which is not being actively utilized, shall be effectively stabilized and visible emissions shall be limited to no greater than 20% opacity for dust emissions by using water, chemical stabilizers, dust suppressants, tarps or other suitable material such as vegetative ground cover.
- b. All on site and off site unpaved roads will be effectively stabilized and visible emissions shall be limited to no greater than 20% opacity for dust emissions by paving, chemical stabilizers, dust suppressants and/or watering.
- c. All unpaved traffic areas one (1) acre or more with 75 or more average vehicle trips per day will be effectively stabilized and visible emission shall be limited to no greater than 20% opacity for dust emissions by paving, chemical stabilizers, dust suppressants and/or watering.
- d. The transport of Bulk Materials shall be completely covered unless six inches of freeboard space from the top of the container is maintained with no spillage and loss of Bulk Material. In addition, the cargo compartment of all Haul Trucks is to be cleaned and/or washed at delivery site after removal of Bulk Material.

- e. All Track-Out or Carry-Out will be cleaned at the end of each workday or immediately when mud or dirt extends a cumulative distance of 50 linear feet or more onto a paved road within an Urban area.
- f. Movement of Bulk Material handling or transfer shall be stabilized prior to handling or at points of transfer with application of sufficient water, chemical stabilizers or by sheltering or enclosing the operation and transfer line.
- g. The construction of any new Unpaved Road is prohibited within any area with a population of 500 or more unless the road meets the definition of a Temporary Unpaved Road. Any temporary unpaved road shall be effectively stabilized and visible emissions shall be limited to no greater than 20% opacity for dust emission by paving, chemical stabilizers, dust suppressants and/or watering.

Construction Combustion Equipment

- a. Use of alternative fueled or catalyst equipped diesel construction equipment, including all off-road and portable diesel powered equipment.
- b. Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes as a maximum.
- c. Limit, to the extent feasible, the hours of operation of heavy duty equipment and/or the amount of equipment in use.
- d. When commercially available, replace fossil fueled equipment with electrically driven equivalents (provided they are not run via a portable generator set).

Project Design Feature 2

The project applicant shall require that all construction equipment utilized during construction of the project shall be equipped with an engine designation of EPA Tier 2 or better (Tier 2+). A list of the construction equipment, including all off-road equipment utilized at each of the projects by make, model, year, horsepower and expected/actual hours of use, and the associated EPA Tier shall be submitted to the County Planning and Development Services Department and ICAPCD prior to the issuance of a grading permit. The equipment list shall be submitted periodically to ICAPCD to perform a NO_x analysis. ICAPCD shall utilize this list to calculate air emissions to verify that equipment use does not exceed significance thresholds. The Planning and Development Services Department and ICAPCD shall verify implementation of this measure.

Project Design Feature 3

The project applicant shall employ a method of dust suppression (such as water or chemical stabilization) approved by ICAPCD. The project applicant shall apply chemical stabilization as directed by the product manufacturer to control dust between the panels as approved by ICAPCD, and other non-used areas (exceptions will be the paved entrance and parking area, and Fire Department access/emergency entry/exit points as approved by Fire/Office of Emergency Services [OES] Department).

Project Design Feature 4

Prior to any earthmoving activity, the applicant shall submit a construction dust control plan and obtain ICAPCD and Imperial County Planning and Development Services Department (ICPDS) approval.

Project Design Feature 5

Prior to issuance of a Certificate of Occupancy, the applicant shall submit an operations dust control plan and obtain ICAPCD and ICPDS approval. ICAPCD Rule 301 Operational Fees apply to any project applying for a building permit. At the time that building permits are submitted for the proposed project, ICAPCD shall review the project to determine if Rule 310 fees are applicable to the project.

Project Design Feature 6

During construction and operation of the proposed project, the applicant shall limit the speed of all vehicles operating onsite on dirt roads to 15 miles per hour or less.

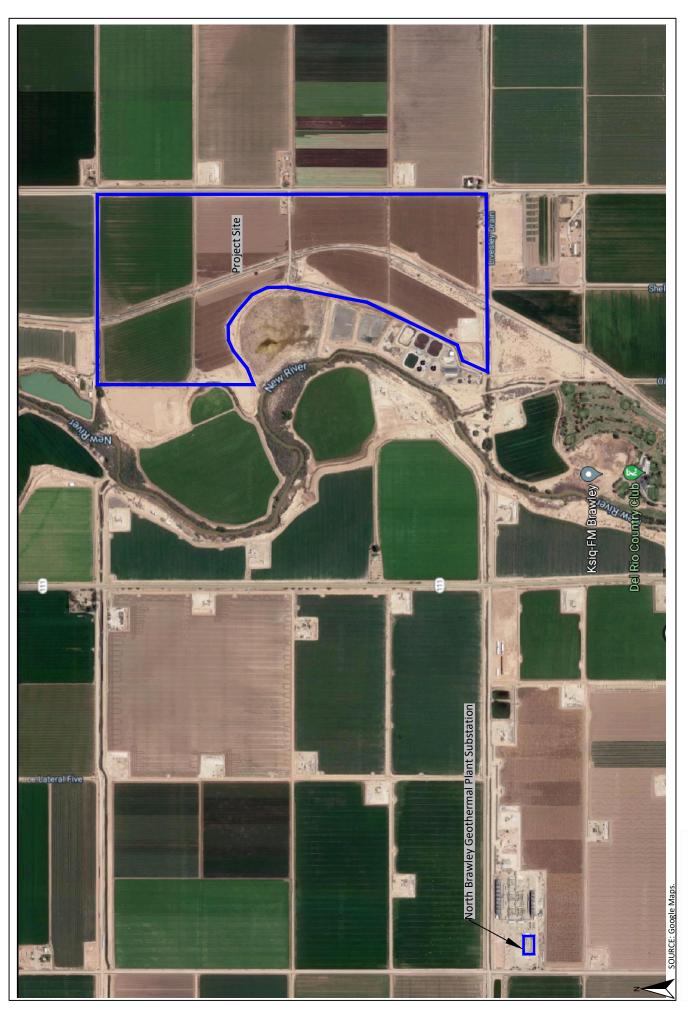
Project Design Feature 7

The project applicant shall require the following measures to be implemented during operation of the project (as detailed above in Section 1.2, the project would operate remotely, with no employees typically onsite, as such the measures specific for onsite employees are not applicable to the project):

- Provide for paving a minimum of 100 feet from the property line for commercial driveways that access County paved roads as per County Standard Commercial Driveway Detail 410B.
- Measures which meet mandatory, prescriptive/performance measures as required by Title 24.

1.6 Mitigation Measures for the Proposed Project

This analysis found that implementation of the State and ICAPCD air quality, energy, and GHG emissions reductions regulations and the Project Design Features provided above in Section 1.5 were adequate to limit criteria pollutants, toxic air contaminants, odors, and GHG emissions from the proposed project to less than significant levels. No mitigation measures are required for the proposed project with respect to air quality, energy, and GHG emissions.







2.0 AIR POLLUTANTS

Air pollutants are generally classified as either criteria pollutants or non-criteria pollutants. Federal ambient air quality standards have been established for criteria pollutants, whereas no ambient standards have been established for non-criteria pollutants. For some criteria pollutants, separate standards have been set for different periods. Most standards have been set to protect public health. For some pollutants, standards have been based on other values (such as protection of crops, protection of materials, or avoidance of nuisance conditions). A summary of federal and state ambient air quality standards is provided in the Regulatory Framework section.

2.1 Criteria Pollutants and Ozone Precursors

The criteria pollutants consist of ozone, nitrogen oxides (NOx), CO, sulfur oxides (SOx), lead, and particulate matter (PM). The ozone precursors consist of NOx and Volatile Organic Compounds (VOC). These pollutants can harm your health and the environment, and cause property damage. The Environmental Protection Agency (EPA) calls these pollutants "criteria" air pollutants because it regulates them by developing human health-based and/or environmentally-based criteria for setting permissible levels. The following provides descriptions of each of the criteria pollutants and ozone precursors.

Nitrogen Oxides

NOx is the generic term for a group of highly reactive gases which contain nitrogen and oxygen. While most NOx are colorless and odorless, concentrations of nitrogen dioxide (NO_2) can often be seen as a reddish-brown layer over many urban areas. NOx form when fuel is burned at high temperatures, as in a combustion process. The primary manmade sources of NOx are motor vehicles, electric utilities, and other industrial, commercial, and residential sources that burn fuel. NOx reacts with other pollutants to form, ground-level ozone, nitrate particles, acid aerosols, as well as NO_2 , which cause respiratory problems. NOx and the pollutants formed from NOx can be transported over long distances, following the patterns of prevailing winds. Therefore, controlling NOx is often most effective if done from a regional perspective, rather than focusing on the nearest sources.

Ozone

Ozone is not usually emitted directly into the air, instead it is created by a chemical reaction between NOx and VOC in the presence of sunlight. Motor vehicle exhaust, industrial emissions, gasoline vapors, chemical solvents as well as natural sources emit NOx and VOC that help form ozone. Ground-level ozone is the primary constituent of smog. Sunlight and hot weather cause ground-level ozone to form with the greatest concentrations usually occurring downwind from urban areas. Ozone is subsequently considered a regional pollutant. Ground-level ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections and can cause substantial damage to vegetation and other materials. Because NOx and VOC are ozone precursors, the health effects associated with ozone are also indirect health effects associated with significant levels of NOx and VOC emissions.

Carbon Monoxide

Carbon monoxide (CO) is a colorless, odorless gas that is formed when carbon in fuel is not burned completely. It is a component of motor vehicle exhaust, which contributes approximately 56 percent of all CO emissions nationwide. In cities, 85 to 95 percent of all CO emissions may come from motor vehicle exhaust. Other sources of CO emissions include industrial processes (such as metals processing and chemical manufacturing), residential wood burning, and natural sources such as forest fires. Woodstoves,

gas stoves, cigarette smoke, and unvented gas and kerosene space heaters are indoor sources of CO. The highest levels of CO in the outside air typically occur during the colder months of the year when inversion conditions are more frequent. The air pollution becomes trapped near the ground beneath a layer of warm air. CO is described as having only a local influence because it dissipates quickly. Since CO concentrations are strongly associated with motor vehicle emissions, high CO concentrations generally occur in the immediate vicinity of roadways with high traffic volumes and traffic congestion, active parking lots, and in automobile tunnels. Areas adjacent to heavily traveled and congested intersections are particularly susceptible to high CO concentrations.

CO is a public health concern because it combines readily with hemoglobin and thus reduces the amount of oxygen transported in the bloodstream. The health threat from lower levels of CO is most serious for those who suffer from heart disease such as angina, clogged arteries, or congestive heart failure. For a person with heart disease, a single exposure to CO at low levels may cause chest pain and reduce that person's ability to exercise; repeated exposures may contribute to other cardiovascular effects. High levels of CO can affect even healthy people. People who breathe high levels of CO can develop vision problems, reduced ability to work or learn, reduced manual dexterity, and difficulty performing complex tasks. At extremely high levels, CO is poisonous and can cause death.

Sulfur Oxides

SOx gases are formed when fuel containing sulfur, such as coal and oil is burned, as well as from the refining of gasoline. SOx dissolves easily in water vapor to form acid and interacts with other gases and particles in the air to form sulfates and other products that can be harmful to people and the environment.

Lead

Lead is a metal found naturally in the environment as well as manufactured products. The major sources of lead emissions have historically been motor vehicles and industrial sources. Due to the phase out of leaded gasoline, metal processing is now the primary source of lead emissions to the air. High levels of lead in the air are typically only found near lead smelters, waste incinerators, utilities, and lead-acid battery manufacturers. Exposure of fetuses, infants and children to low levels of lead can adversely affect the development and function of the central nervous system, leading to learning disorders, distractibility, inability to follow simple commands, and lower intelligence quotient. In adults, increased lead levels are associated with increased blood pressure.

Particulate Matter

PM is the term for a mixture of solid particles and liquid droplets found in the air. PM is made up of a number of components including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. The size of particles is directly linked to their potential for causing health problems. Particles that are less than 10 micrometers in diameter (PM10) that are also known as *Respirable Particulate Matter* are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. Particles that are less than 2.5 micrometers in diameter (PM2.5) that are also known as *Fine Particulate Matter* have been designated as a subset of PM10 due to their increased negative health impacts and its ability to remain suspended in the air longer and travel further.

Volatile Organic Compounds

Hydrocarbons are organic gases that are formed from hydrogen and carbon and sometimes other elements. Hydrocarbons that contribute to formation of ozone are referred to and regulated as VOCs (also

referred to as reactive organic gases). Combustion engine exhaust, oil refineries, and fossil-fueled power plants are the sources of hydrocarbons. Other sources of hydrocarbons include evaporation from petroleum fuels, solvents, dry cleaning solutions, and paint.

VOC is not classified as a criteria pollutant, since VOCs by themselves are not a known source of adverse health effects. The primary health effects of VOCs result from the formation of ozone and its related health effects. High levels of VOCs in the atmosphere can interfere with oxygen intake by reducing the amount of available oxygen through displacement. Carcinogenic forms of hydrocarbons, such as benzene, are considered toxic air contaminants (TACs). There are no separate health standards for VOCs as a group.

2.2 Other Pollutants of Concern

Toxic Air Contaminants

In addition to the above-listed criteria pollutants, toxic air contaminants (TACs) are another group of pollutants of concern. TACs is a term that is defined under the California Clean Air Act and consists of the same substances that are defined as Hazardous Air Pollutants (HAPs) in the Federal Clean Air Act. There are over 700 hundred different types of TACs with varying degrees of toxicity. Sources of TACs include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. Cars and trucks release at least 40 different toxic air contaminants. The most important of these TACs, in terms of health risk, are diesel particulates, benzene, formaldehyde, 1,3-butadiene, and acetaldehyde. Public exposure to TACs can result from emissions from normal operations as well as from accidental releases. Health effects of TACs include cancer, birth defects, neurological damage, and death.

TACs are less pervasive in the urban atmosphere than criteria air pollutants, however they are linked to short-term (acute) or long-term (chronic or carcinogenic) adverse human health effects. There are hundreds of different types of TACs with varying degrees of toxicity. Sources of TACs include industrial processes, commercial operations (e.g., gasoline stations and dry cleaners), and motor vehicle exhaust.

According to *The California Almanac of Emissions and Air Quality 2013 Edition*, the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important of which is DPM. DPM is a subset of PM2.5 because the size of diesel particles are typically 2.5 microns and smaller. The identification of DPM as a TAC in 1998 led the CARB to adopt the Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-fueled Engines and Vehicles in September 2000. The plan's goals are a 75-percent reduction in DPM by 2010 and an 85-percent reduction by 2020 from the 2000 baseline. Diesel engines emit a complex mixture of air pollutants, composed of gaseous and solid material. The visible emissions in diesel exhaust are known as particulate matter or PM, which includes carbon particles or "soot." Diesel exhaust also contains a variety of harmful gases and over 40 other cancer-causing substances. California's identification of DPM as a toxic air contaminant was based on its potential to cause cancer, premature deaths, and other health problems. Exposure to DPM is a health hazard, particularly to children whose lungs are still developing and the elderly who may have other serious health problems. Overall, diesel engine emissions are responsible for the majority of California's potential airborne cancer risk from combustion sources.

Asbestos

Asbestos is listed as a TAC by CARB and as a HAP by the EPA. Asbestos occurs naturally in mineral formations and crushing or breaking these rocks, through construction or other means, can release

asbestiform fibers into the air. Asbestos emissions can result from the sale or use of asbestos-containing materials, road surfacing with such materials, grading activities, and surface mining. The risk of disease is dependent upon the intensity and duration of exposure. When inhaled, asbestos fibers may remain in the lungs and with time may be linked to such diseases as asbestosis, lung cancer, and mesothelioma. The nearest likely locations of naturally occurring asbestos, as identified in the *General Location Guide for Ultramafic Rocks in California*, prepared by the California Division of Mines and Geology, is located in Santa Barbara County. The nearest historic asbestos mine to the project site, as identified in the *Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Occurrences of Asbestos in California*, prepared by U.S. Geological Survey, is located at Asbestos Mountain, which is approximately 70 miles northwest of the project site in the San Jacinto Mountains. Due to the distance to the nearest natural occurrences of asbestos, the project site is not likely to contain asbestos.

3.0 GREENHOUSE GASES

3.1 Greenhouse Gases

Constituent gases of the Earth's atmosphere, called atmospheric greenhouse gases (GHGs), play a critical role in the Earth's radiation amount by trapping infrared radiation from the Earth's surface, which otherwise would have escaped to space. Prominent greenhouse gases contributing to this process include carbon dioxide (CO₂), methane (CH₄), ozone, water vapor, nitrous oxide (N₂O), and chlorofluorocarbons (CFCs). This phenomenon, known as the Greenhouse Effect, is responsible for maintaining a habitable climate. Anthropogenic (caused or produced by humans) emissions of these greenhouse gases in excess of natural ambient concentrations are responsible for the enhancement of the Greenhouse Effect and have led to a trend of unnatural warming of the Earth's natural climate, known as global warming or climate change. Emissions of gases that induce global warming are attributable to human activities associated with industrial/manufacturing, agriculture, utilities, transportation, and residential land uses. Emissions of CO₂ and N₂O are byproducts of fossil fuel combustion. Methane, a potent greenhouse gas, results from off-gassing associated with agricultural practices and landfills. Sinks of CO₂, where CO₂ is stored outside of the atmosphere, include uptake by vegetation and dissolution into the ocean. The following provides a description of each of the greenhouse gases and their global warming potential.

Water Vapor

Water vapor is the most abundant, important, and variable GHG in the atmosphere. Water vapor is not considered a pollutant; in the atmosphere it maintains a climate necessary for life. Changes in its concentration are primarily considered a result of climate feedbacks related to the warming of the atmosphere rather than a direct result of industrialization. The feedback loop in which water is involved is critically important to projecting future climate change. As the temperature of the atmosphere rises, more water is evaporated from ground storage (rivers, oceans, reservoirs, soil). Because the air is warmer, the relative humidity can be higher (in essence, the air is able to "hold" more water when it is warmer), leading to more water vapor in the atmosphere. As a GHG, the higher concentration of water vapor is then able to absorb more thermal indirect energy radiated from the Earth, thus further warming the atmosphere. The warmer atmosphere can then hold more water vapor and so on and so on. This is referred to as a "positive feedback loop." The extent to which this positive feedback loop will continue is unknown as there is also dynamics that put the positive feedback loop in check. As an example, when water vapor increases in the atmosphere, more of it will eventually also condense into clouds, which are more able to reflect incoming solar radiation (thus allowing less energy to reach the Earth's surface and heat it up).

Carbon Dioxide

The natural production and absorption of CO_2 is achieved through the terrestrial biosphere and the ocean. However, humankind has altered the natural carbon cycle by burning coal, oil, natural gas, and wood. Since the industrial revolution began in the mid 1700s, each of these activities has increased in scale and distribution. CO_2 was the first GHG demonstrated to be increasing in atmospheric concentration with the first conclusive measurements being made in the last half of the 20^{th} century. Prior to the industrial revolution, concentrations were fairly stable at 280 parts per million (ppm). The International Panel on Climate Change (IPCC) indicates that concentrations were 379 ppm in 2005, an increase of more than 30 percent. Left unchecked, the IPCC projects that concentration of carbon dioxide in the atmosphere is projected to increase to a minimum of 540 ppm by 2100 as a direct result of anthropogenic sources. This

could result in an average global temperature rise of at least two degrees Celsius or 3.6 degrees Fahrenheit.

Methane

 CH_4 is an extremely effective absorber of radiation, although its atmospheric concentration is less than that of CO_2 . Its lifetime in the atmosphere is brief (10 to 12 years), compared to some other GHGs (such as CO_2 , N_2O , and CFCs). CH_4 has both natural and anthropogenic sources. It is released as part of the biological processes in low oxygen environments, such as in swamplands or in rice production (at the roots of the plants). Over the last 50 years, human activities such as growing rice, raising cattle, using natural gas, and mining coal have added to the atmospheric concentration of methane. Other anthropocentric sources include fossil-fuel combustion and biomass burning.

Nitrous Oxide

Concentrations of N_2O also began to rise at the beginning of the industrial revolution. In 1998, the global concentration of this GHG was documented at 314 parts per billion (ppb). N_2O is produced by microbial processes in soil and water, including those reactions which occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. N_2O is also commonly used as an aerosol spray propellant (i.e., in whipped cream bottles, in potato chip bags to keep chips fresh, and in rocket engines and race cars).

Chlorofluorocarbons

CFCs are gases formed synthetically by replacing all hydrogen atoms in methane or ethane with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (the level of air at the Earth's surface). CFCs have no natural source, but were first synthesized in 1928. They were used for refrigerants, aerosol propellants, and cleaning solvents. Due to the discovery that they are able to destroy stratospheric ozone, a global effort to halt their production was undertaken and in 1989 the European Community agreed to ban CFCs by 2000 and subsequent treaties banned CFCs worldwide by 2010. This effort was extremely successful, and the levels of the major CFCs are now remaining level or declining. However, their long atmospheric lifetimes mean that some of the CFCs will remain in the atmosphere for over 100 years.

Hydrofluorocarbons

Hydrofluorocarbons (HFCs) are synthetic man-made chemicals that are used as a substitute for CFCs. Out of all the GHGs, they are one of three groups with the highest global warming potential. The HFCs with the largest measured atmospheric abundances are (in order), HFC-23 (CHF $_3$), HFC-134a (CF $_3$ CH $_2$ F), and HFC-152a (CH $_3$ CHF $_2$). Prior to 1990, the only significant emissions were HFC-23. HFC-134a use is increasing due to its use as a refrigerant. Concentrations of HFC-23 and HFC-134a in the atmosphere are now about 10 parts per trillion (ppt) each. Concentrations of HFC-152a are about 1 ppt. HFCs are manmade for applications such as automobile air conditioners and refrigerants.

Perfluorocarbons

Perfluorocarbons (PFCs) have stable molecular structures and do not break down through the chemical processes in the lower atmosphere. High-energy ultraviolet rays about 60 kilometers above Earth's surface are able to destroy the compounds. Because of this, PFCs have very long lifetimes, between 10,000 and 50,000 years. Two common PFCs are tetrafluoromethane (CF_4) and hexafluoroethane (C_2F_6).

Concentrations of CF₄ in the atmosphere are over 70 ppt. The two main sources of PFCs are primary aluminum production and semiconductor manufacturing.

Sulfur Hexafluoride

Sulfur Hexafluoride (SF_6) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. SF_6 has the highest global warming potential of any gas evaluated; 23,900 times that of CO_2 . Concentrations in the 1990s were about 4 ppt. Sulfur hexafluoride is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

Aerosols

Aerosols are particles emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light. Cloud formation can also be affected by aerosols. Sulfate aerosols are emitted when fuel containing sulfur is burned. Black carbon (or soot) is emitted during biomass burning due to the incomplete combustion of fossil fuels. Particulate matter regulation has been lowering aerosol concentrations in the United States; however, global concentrations are likely increasing.

3.2 Global Warming Potential

GHGs have varying global warming potential (GWP). The GWP is the potential of a gas or aerosol to trap heat in the atmosphere; it is the cumulative radiative forcing effects of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to the reference gas, CO₂. The GHGs listed by the IPCC and the CEQA Guidelines are discussed in this section in order of abundance in the atmosphere. Water vapor, the most abundant GHG, is not included in this list because its natural concentrations and fluctuations far outweigh its anthropogenic (human-made) sources. To simplify reporting and analysis, GHGs are commonly defined in terms of their GWP. The IPCC defines the GWP of various GHG emissions on a normalized scale that recasts all GHG emissions in terms of CO₂ equivalent (CO₂e). As such, the GWP of CO₂ is equal to 1. The GWP values used in this analysis are based on the 2007 IPCC Fourth Assessment Report, which are used in CARB's 2014 Scoping Plan Update and the CalEEMod Model Version 2016.3.2 and are detailed in Table A. The IPCC has updated the Global Warming Potentials of some gases in their Fifth Assessment Report, however the new values have not yet been incorporated into the CalEEMod model that has been utilized in this analysis.

Table A - Global Warming Potentials, Atmospheric Lifetimes and Abundances of GHGs

Gas	Atmospheric Lifetime (years)¹	Global Warming Potential (100 Year Horizon) ²	Atmospheric Abundance
Carbon Dioxide (CO ₂)	50-200	1	379 ppm
Methane (CH ₄)	9-15	25	1,774 ppb
Nitrous Oxide (N ₂ O)	114	298	319 ppb
HFC-23	270	14,800	18 ppt
HFC-134a	14	1,430	35 ppt
HFC-152a	1.4	124	3.9 ppt
PFC: Tetrafluoromethane (CF ₄)	50,000	7,390	74 ppt
PFC: Hexafluoroethane (C ₂ F ₆)	10,000	12,200	2.9 ppt
Sulfur Hexafluoride (SF ₆)	3,200	22,800	5.6 ppt

Notes:

Source: IPCC 2007, EPA 2015

3.3 Greenhouse Gas Emissions Inventory

According to the Carbon Dioxide Information Analysis Center¹, 9,855 million metric tons (MMT) of CO_2e emissions were created globally in the year 2014. According to the Environmental Protection Agency (EPA), the breakdown of global GHG emissions by sector consists of: 25 percent from electricity and heat production; 21 percent from industry; 24 percent from agriculture, forestry and other land use activities; 14 percent from transportation; 6 percent from building energy use; and 10 percent from all other sources of energy use².

According to *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2019*, prepared by EPA, in 2019 total U.S. GHG emissions were 6,558 million metric tons (MMT) of CO₂e emissions. Total U.S. emissions have increased by 4 percent between 1990 and 2016 and GHG emissions decreased by 13 percent between 2005 and 2019. The recent decrease in GHG emissions was a result of multiple factors, including population, economic growth, energy markets, and technological changes the include energy efficiency and energy fuel choices. Between 2018 and 2019, GHG emissions decreased by almost 2 percent due to multiple factors, including a one percent decrease in total energy use.

According to California Greenhouse Gas Emissions for 2000 to 2019 Trends of Emissions and Other Indicators, prepared by CARB, July 28, 2021, the State of California created 418.2 million metric tons of carbon dioxide equivalent (MMTCO₂e) in 2019. The 2019 emissions were 7.2 MMTCO₂e lower than 2018 levels and almost 13 MMTCO₂e below the State adopted year 2020 GHG limit of 431 MMTCO₂e. The breakdown of California GHG emissions by sector consists of: 39.7 percent from transportation; 21.1 percent from industrial; 14.1 percent from electricity generation; 7.6 percent from agriculture; 10.5 percent from residential and commercial buildings; 4.9 percent from high global warming potential sources, and 2.1 percent from waste.

¹ Defined as the half-life of the gas.

² Compared to the same quantity of CO₂ emissions and is based on the Intergovernmental Panel On Climate Change (IPCC) 2007 standard, which is utilized in CalEEMod (Version 2016.3.2), that is used in this report (CalEEMod user guide: Appendix A).

Definitions: ppm = parts per million; ppb = parts per billion; ppt = parts per trillion

¹ Obtained from: https://cdiac.ess-dive.lbl.gov/trends/emis/tre_glob_2014.html

² Obtained from: https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data

4.0 AIR QUALITY MANAGEMENT

The air quality at the project site is addressed through the efforts of various international, federal, state, regional, and local government agencies. These agencies work jointly, as well as individually, to improve air quality through legislation, regulations, planning, policy-making, education, and a variety of programs. The agencies responsible for improving the air quality are discussed below.

4.1 Federal – United States Environmental Protection Agency

The Clean Air Act, first passed in 1963 with major amendments in 1970, 1977 and 1990, is the overarching legislation covering regulation of air pollution in the United States. The Clean Air Act has established the mandate for requiring regulation of both mobile and stationary sources of air pollution at the state and federal level. The EPA was created in 1970 in order to consolidate research, monitoring, standard-setting and enforcement authority into a single agency.

The EPA is responsible for setting and enforcing the National Ambient Air Quality Standards (NAAQS) for atmospheric pollutants. It regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships, and certain locomotives. NAAQS pollutants were identified using medical evidence and are shown below in Table B.

Table B – State and Federal Criteria Pollutant Standards

Air	Air Concentration / Averaging Time		
Pollutant	California	Federal Primary	
Pollutalit	Standards	Standards	Most Relevant Effects
Ozone (O₃)	0.09 ppm / 1-hour 0.07 ppm / 8-hour	0.070 ppm, / 8-hour	(a) Pulmonary function decrements and localized lung edema in humans and animals; (b) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (c) Increased mortality risk; (d) Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (e) Vegetation damage; and (f) Property damage.
Carbon Monoxide (CO)	20.0 ppm / 1-hour 9.0 ppm / 8-hour	35.0 ppm / 1-hour 9.0 ppm / 8-hour	(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Impairment of central nervous system functions; and (d) Possible increased risk to fetuses.
Nitrogen Dioxide (NO ₂)	0.18 ppm / 1-hour 0.030 ppm / annual	100 ppb / 1-hour 0.053 ppm / annual	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; and (c) Contribution to atmospheric discoloration.
Sulfur Dioxide (SO ₂)	0.25 ppm / 1-hour 0.04 ppm / 24-hour	75 ppb / 1-hour 0.14 ppm/annual	(a) Bronchoconstriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma.
Suspended Particulate Matter (PM ₁₀)	50 μg/m³ / 24-hour 20 μg/m³ / annual	150 μg/m³ / 24- hour	(a) Exacerbation of symptoms in sensitive patients with respiratory or cardiovascular disease; (b) Declines in pulmonary function growth in children; and (c) Increased risk of premature death from heart or lung diseases in elderly.

Air	Concentration /	Averaging Time	
Pollutant	California Standards	Federal Primary Standards	Most Relevant Effects
Suspended Particulate Matter (PM _{2.5})	12 μg/m³ / annual	35 μg/m³ / 24-hour 12 μg/m³ / annual	
Sulfates	25 μg/m³ / 24-hour	No Federal Standards	(a) Decrease in ventilatory function; (b) Aggravation of asthmatic symptoms; (c) Aggravation of cardio-pulmonary disease; (d) Vegetation damage; (e) Degradation of visibility; and (f) Property damage.
Lead	1.5 μg/m³ / 30-day	0.15 μg/m³ /3- month rolling	(a) Learning disabilities; and (b) Impairment of blood formation and nerve conduction.
Visibility Reducing Particles	Extinction coefficient of 0.23 per kilometer - visibility of ten miles or more due to particles when relative humidity is less than 70 percent.	No Federal Standards	Visibility impairment on days when relative humidity is less than 70 percent.

Source: http://www.arb.ca.gov/research/aaqs/aaqs2.pdf.

As part of its enforcement responsibilities, the EPA requires each state with federal nonattainment areas to prepare and submit a State Implementation Plan (SIP) that demonstrates the means to attain the national standards. The SIP must integrate federal, state, and local components and regulations to identify specific measures to reduce pollution, using a combination of performance standards and market-based programs within the timeframe identified in the SIP. The CARB defines attainment as the category given to an area with no violations in the past three years.

As indicated below in Table C, the ICAPCD portion of the Salton Sea Air Basin has been designated by EPA for the national standards as a non-attainment area for ozone, respirable particulates (PM10), and fine particulate matter (PM2.5). Currently, the ICAPCD is in attainment with the national ambient air quality standards for carbon monoxide (CO), sulfur dioxide (SO_2), and nitrogen dioxide (SO_2).

Table C - Salton Sea Air Basin Attainment Status

Pollutant	Federal Designation	State Designation
Ozone (O ₃) – 2008 Standard	Nonattainment (Moderate)	Nonattainment
Respirable Particulate Matter (PM10)	Nonattainment (Serious)	Nonattainment
Fine Particulate Matter (PM2.5)	Nonattainment (Moderate)	Nonattainment
Carbon Monoxide (CO)	Attainment	Attainment
Nitrogen Dioxide (NO ₂)	Attainment	Attainment
Sulfur Dioxide (SO ₂)	Attainment	Attainment

 $Source: \underline{https://ww3.arb.ca.gov/desig/adm/adm.htm}; \textbf{and} \underline{https://ww3.arb.ca.gov/planning/sip/planarea/imperial/staffreport121318.pdf}$

4.2 State - California Air Resources Board

The CARB, which is a part of the California Environmental Protection Agency, is responsible for the coordination and administration of both federal and state air pollution control programs within California. In this capacity, the CARB conducts research, sets the California Ambient Air Quality Standards (CAAQS), compiles emission inventories, develops suggested control measures, provides oversight of local programs, and prepares the SIP. The CAAQS for criteria pollutants are shown above in Table B. In addition, the CARB establishes emission standards for motor vehicles sold in California, consumer products (e.g. hairspray, aerosol paints, and barbeque lighter fluid), and various types of commercial equipment. It also sets fuel specifications to further reduce vehicular emissions.

The ICAPCD has been designated by the CARB as a non-attainment area for ozone, PM10, and PM2.5. Currently, the ICAPCD is in attainment with the ambient air quality standards for CO, NO_2 , and SO_2 .

The following lists the State of California Code of Regulations (CCR) air quality emission rules that are applicable, but not limited to all non-residential projects in the State.

Assembly Bill 2588

The Air Toxics "Hot Spots" Information and Assessment Act (Assembly Bill [AB] 2588, 1987, Connelly) was enacted in 1987 as a means to establish a formal air toxics emission inventory risk quantification program. AB 2588, as amended, establishes a process that requires stationary sources to report the type and quantities of certain substances their facilities routinely release in California. The data is ranked by high, intermediate, and low categories, which are determined by: the potency, toxicity, quantity, volume, and proximity of the facility to nearby receptors.

CARB Regulation for In-Use Off-Road Diesel Vehicles

On July 26, 2007, the CARB adopted California Code of Regulations Title 13, Article 4.8, Chapter 9, Section 2449 to reduce DPM and NOx emissions from in-use off-road heavy-duty diesel vehicles in California. Such vehicles are used in construction, mining, and industrial operations. The regulation limits idling to no more than five consecutive minutes, requires reporting and labeling, and requires disclosure of the regulation upon vehicle sale. Performance requirements of the rule are based on a fleet's average NOx emissions, which can be met by replacing older vehicles with newer, cleaner vehicles or by applying exhaust retrofits. The regulation was amended in 2010 to delay the original timeline of the performance requirement making the first compliance deadline January 1, 2014 for large fleets (over 5,000 horsepower), 2017 for medium fleets (2,501-5,000 horsepower), and 2019 for small fleets (2,500 horsepower or less). Currently, no commercial operation in California may add any equipment to their fleet that has a Tier 0 or Tier 1 engine. By January 1, 2018 medium and large fleets will be restricted from adding Tier 2 engines to their fleets and by January 2023, no commercial operation will be allowed to add Tier 2 engines to their fleets. It should be noted that commercial fleets may continue to use their existing Tier 0 and 1 equipment, if they can demonstrate that the average emissions from their entire fleet emissions meet the NOx emissions targets.

CARB Resolution 08-43 for On-Road Diesel Truck Fleets

On December 12, 2008 the CARB adopted Resolution 08-43, which limits NOx, PM10 and PM2.5 emissions from on-road diesel truck fleets that operate in California. On October 12, 2009 Executive Order R-09-010 was adopted that codified Resolution 08-43 into Section 2025, title 13 of the California Code of Regulations. This regulation requires that by the year 2023 all commercial diesel trucks that operate in

California shall meet model year 2010 (Tier 4 Final) or latter emission standards. In the interim period, this regulation provides annual interim targets for fleet owners to meet. By January 1, 2014, 50 percent of a truck fleet is required to have installed Best Available Control Technology (BACT) for NOx emissions and 100 percent of a truck fleet installed BACT for PM10 emissions. This regulation also provides a few exemptions including a onetime per year 3-day pass for trucks registered outside of California. All onroad diesel trucks utilized during construction of the proposed project will be required to comply with Resolution 08-43.

4.3 Local - County of Imperial

The ICAPCD is the agency principally responsible for comprehensive air pollution control in the County. To that end, as a regional agency, the ICAPCD works directly with the Southern California Association of Governments (SCAG), the Imperial County Transportation Commission (ICTC), and local governments and cooperates actively with all federal and state agencies.

Imperial County Air Pollution Control District

The ICAPCD is the agency principally responsible for comprehensive air pollution control in Imperial County. To that end, as a regional agency, the ICAPCD works directly with the County and incorporated communities as well as the military bases within the County to control air emissions within the County.

The ICAPCD has addressed each of three nonattainment pollutants in separate State Implementation Plans (SIPs). For ozone the most current SIP is the Imperial County 2017 State Implementation Plan for the 2008 8-Hour Ozone Standard (2017 Ozone SIP), prepared by ICAPCD, September 2017, which was prepared to detail measures to reduce ozone precursors (i.e., reactive organic gases [ROGs] and NOx) within the County in order to meet the 2008 NAAQS for 8-hour ozone standard of 0.075 parts per million (ppm) by July 20, 2018. Although the Ozone 2017 SIP demonstrates that the County met the 8-hour ozone standard of 0.075 ppm by the July 20, 2018, requirement, it should be noted that in 2015 the USEPA further strengthened its 8-hour ozone standard to 0.070 ppm, which will require an updated SIP for the County to meet the new ozone standard.

Since PM10 in the County has met the 24-hour NAAQS other than for exceptional events that include storms as well as from substantial PM10 concentrations blowing into the County from Mexico, the most current PM10 plan is the Imperial County 2018 Redesignation Request and Maintenance Plan for Particulate Matter less than 10 Microns in Diameter (2018 PM10 Plan), prepared by ICAPCD, October 23, 2018. The 2018 PM10 Plan shows that the monitoring of PM10 in the County found that other than exceptional events, no violation of the 24-hour PM10 NAAQS of 150 micrograms per cubic meter (µg/m3) occurred over the 2014 to 2016 time period. As such, the ICAPCD has requested the USEPA to redesignate the Air Basin to maintenance. The redesignation was anticipated to occur sometime in the year 2020.

For PM2.5 the most current SIP is the Imperial County 2018 Annual Particulate Matter less than 2.5 Microns in Diameter State Implementation Plan (2018 PM2.5 SIP), prepared by ICAPCD, April 2018, which was prepared to detail measures to meet the 2012 NAAQS for annual PM2.5 – standard of 12 μ g/m3 by the end of 2021 for the portion of Imperial County (approximately from Brawley to Mexico border) that is designated nonattainment. The PM2.5 Plan found that the only monitoring station in the County that has recorded an exceedance of PM2.5 is the Calexico Monitoring Station and that the exceedance is likely caused by the transport of PM2.5 across the border from Mexico. It is anticipated that the ICAPCD will submit a redesignation request for PM2.5 in the near future.

Although ICAPCD is responsible for regional air quality planning efforts, it does not have the authority to directly regulate air quality issues associated with plans and new development projects throughout the County. Instead, this is controlled through local jurisdictions in accordance with the California Environmental Quality Act (CEQA). In order to assist local jurisdictions with air quality compliance issues the CEQA Air Quality Handbook (CEQA Handbook), prepared by ICAPCD on December 12, 2017, was developed in accordance with the projections and programs detailed in the AQMPs. The purpose of the CEQA Handbook is to assist Lead Agencies, as well as consultants, project proponents, and other interested parties in evaluating a proposed project's potential air quality impacts. Specifically, the CEQA Handbook explains the procedures that ICAPCD recommends be followed for the environmental review process required by CEQA. The CEQA Handbook provides direction on how to evaluate potential air quality impacts, how to determine whether these impacts are significant, and how to mitigate these impacts. The ICAPCD intends that by providing this guidance, the air quality impacts of plans and development proposals will be analyzed accurately and consistently throughout the County, and adverse impacts will be minimized.

The following provides the ICAPCD regulations that are applicable but not limited to industrial development projects in the County.

Regulation II - Permits

Rule 201 requires that a permit to construct and operate be obtained prior to start of construction activities for all facilities that need to obtain an Air Quality Permit from the ICAPCD to operate, which includes backup diesel generators. Rule 208 requires a permit for all facilities prior to the construction, installation, modification, replacement, and operation of any equipment which may emit air contaminants.

Regulation VIII – Fugitive Dust Rules

Rule 800 provides general requirements for the control of fugitive dust. Rule 801 provides specific rules for fugitive dust emissions created during construction and earthmoving activities. Rule 802 provides specific rules for fugitive dust emissions from bulk materials. Rule 803 provides specific rules for carryout and track-out. Rule 805 provides specific rules for fugitive dust emissions from paved and unpaved roads.

Imperial County Transportation Commission

The ICTC serves as the regional delegated transportation commission for Imperial County that participates in development and implementation of the RTP and distributes and oversees the Local Transportation Fund. ICTC's jurisdiction includes the seven incorporated cities in the County, the unincorporated County and the Imperial Valley Transit (IVT) System.

Southern California Association of Governments

The SCAG is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino, and Imperial Counties and addresses regional issues relating to transportation, the economy, community development and the environment. SCAG is the federally designated Metropolitan Planning Organization (MPO) for the majority of the southern California region and is the largest MPO in the nation. With respect to air quality planning, SCAG has prepared the 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy (Connect SoCal), adopted September 3, 2020 and the 2019 Federal Transportation Improvement Program (2019 FTIP), adopted September 2018, which addresses regional development and

growth forecasts. Although the Connect SoCal and 2019 FTIP are primarily planning documents for future transportation projects a key component of these plans are to integrate land use planning with transportation planning that promotes higher density infill development in close proximity to existing transit service. These plans form the basis for the land use and transportation components of the AQMP, which are utilized in the preparation of air quality forecasts and in the consistency analysis included in the AQMP. The Connect SoCal, 2019 FTIP, and AQMP are based on projections originating within the City and County General Plans.

5.0 ENERGY CONSERVATION MANAGEMENT

The regulatory setting related to energy conservation is primarily addressed through State and County regulations, which are discussed below.

5.1 State

Energy conservation management in the State was initiated by the 1974 Warren-Alquist State Energy Resources Conservation and Development Act that created the California Energy Resource Conservation and Development Commission (currently named California Energy Commission [CEC]), which was originally tasked with certifying new electric generating plants based on the need for the plant and the suitability of the site of the plant. In 1976 the Warren-Alquist Act was expanded to include new restrictions on nuclear generating plants, that effectively resulted in a moratorium of any new nuclear generating plants in the State. The following details specific regulations adopted by the State in order to reduce the consumption of energy.

California Code of Regulations (CCR) Title 20

On November 3, 1976 the CEC adopted the *Regulations for Appliance Efficiency Standards Relating to Refrigerators, Refrigerator-Freezers and Freezers and Air Conditioners*, which were the first energy-efficiency standards for appliances. The appliance efficiency regulations have been updated several times by the Commission and the most current version is the *2016 Appliance Efficiency Regulations*, adopted January 2017 and now includes almost all types of appliances and lamps that use electricity, natural gas as well as plumbing fixtures. The authority for the CEC to control the energy-efficiency of appliances is detailed in California Code of Regulations (CCR), Title 20, Division 2, Chapter 4, Article 4, Sections 1601-1609.

California Code of Regulations (CCR) Title 24, Part 6

The CEC is also responsible for implementing the CCR Title 24, Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings (Title 24 Part 6) that were first established in 1978 in response to a legislative mandate to reduce California's energy consumption. In 2008 the State set an energy-use reduction goal of zero-net-energy use of all new homes by 2020 and the CEC was mandated to meet this goal through revisions to the Title 24, Part 6 regulations.

The Title 24 standards are updated on a three-year schedule and since 2008 the standards have been incrementally moving to the 2020 goal of the zero-net-energy use. On January 1, 2020 the 2019 standards went into effect, that have been designed so that the average new home built in California will now use zero-net-energy and that non-residential buildings will use about 30 percent less energy than the 2016 standards due mainly to lighting upgrades. The 2019 standards also encourage the use of battery storage and heat pump water heaters, require the more widespread use of LED lighting, as well as improve the building's thermal envelope through high performance attics, walls and windows. The 2019 standards also require improvements to ventilation systems by requiring highly efficient air filters to trap hazardous air particulates as well as improvements to kitchen ventilation systems.

California Code of Regulations (CCR) Title 24, Part 11

CCR Title 24, Part 11: California Green Building Standards (CalGreen) was developed in response to continued efforts to reduce GHG emissions associated with energy consumption. The CalGreen Building

Standards are also updated every three years and the current version is the 2019 California Green Building Standard Code that become effective on January 1, 2020.

The CALGreen Code contains requirements for construction site selection; storm water control during construction; construction waste reduction; indoor water use reduction; material selection; natural resource conservation; site irrigation conservation; and more. The code provides for design options allowing the designer to determine how best to achieve compliance for a given site or building condition. The code also requires building commissioning, which is a process for verifying that all building systems (e.g., heating and cooling equipment and lighting systems) are functioning at their maximum efficiency.

The CALGreen Code provides standards for bicycle parking, carpool/vanpool/electric vehicle spaces, light and glare reduction, grading and paving, energy efficient appliances, renewable energy, graywater systems, water efficient plumbing fixtures, recycling and recycled materials, pollutant controls (including moisture control and indoor air quality), acoustical controls, storm water management, building design, insulation, flooring, and framing, among others. Implementation of the CALGreen Code measures reduces energy consumption and vehicle trips and encourages the use of alternative-fuel vehicles, which reduces pollutant emissions.

Some of the notable changes in the 2019 CALGreen Code over the prior 2016 CALGreen Code include: an alignment of building code engineering requirements with the national standards that include anchorage requirements for solar panels, provides design requirements for buildings in tsunami zones, increases Minimum Efficiency Reporting Value (MERV) for air filters from 8 to 13, increased electric vehicle charging requirements in parking areas, and sets minimum requirements for use of shade trees.

Senate Bill 100

Senate Bill 100 (SB 100) was adopted September 2018 and requires that by December 1, 2045 that 100 percent of retail sales of electricity to be generated from renewable or zero-carbon emission sources of electricity. SB 100 supersedes the renewable energy requirements set by SB 350, SB 1078, SB 107, and SB X1-2. However, the interim renewable energy thresholds from the prior Bills of 44 percent by December 31, 2024, 52 percent by December 31, 2027, and 60 percent by December 31, 2030, will remain in effect.

Executive Order B-48-18 and Assembly Bill 2127

The California Governor issued Executive Order B-48-18 on January 26, 2018 that orders all state entities to work with the private sector to put at least five million zero-emission vehicles on California roads by 2030 and to install 200 hydrogen fueling stations and 250,000 electric vehicle chargers by 2025. Currently there are approximately 350,000 electric vehicles operating in California, which represents approximately 1.5 percent of the 24 million vehicles total currently operating in California. Implementation of Executive Order B-48-18 would result in approximately 20 percent of all vehicles in California to be zero emission electric vehicles. Assembly Bill 2127 (AB 2127) was codified into statute on September 13, 2018 and requires that the California Energy Commission working with the State Air Resources Board prepare biannual assessments of the statewide electric vehicle charging infrastructure needed to support the levels of zero emission vehicle adoption required for the State to meet its goals of putting at least 5 million zero-emission vehicles on California roads by 2030.

Assembly Bill 1109

California Assembly Bill 1109 (AB 1109) was adopted October 2007, also known as the Lighting Efficiency and Toxics Reduction Act, prohibits the manufacturing of lights after January 1, 2010 that contain levels of hazardous substances prohibited by the European Union pursuant to the RoHS Directive. AB 1109 also requires reductions in energy usage for lighting and is structured to reduce lighting electrical consumption by: (1) At least 50 percent reduction from 2007 levels for indoor residential lighting; and (2) At least 25 percent reduction from 2007 levels for indoor commercial and all outdoor lighting by 2018. AB 1109 would reduce GHG emissions through reducing the amount of electricity required to be generated by fossil fuels in California.

Assembly Bill 1493

California Assembly Bill 1493 (also known as the Pavley Bill, in reference to its author Fran Pavley) was enacted on July 22, 2002 and required CARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. In 2004, CARB approved the "Pavley I" regulations limiting the amount of GHGs that may be released from new passenger automobiles that are being phased in between model years 2009 through 2016. These regulations will reduce GHG emissions by 30 percent from 2002 levels by 2016. In June 2009, the EPA granted California the authority to implement GHG emission reduction standards for light duty vehicles, in September 2009, amendments to the Pavley I regulations were adopted by CARB and implementation of the "Pavley I" regulations started in 2009.

The second set of regulations "Pavley II" was developed in 2010, and is being phased in between model years 2017 through 2025 with the goal of reducing GHG emissions by 45 percent by the year 2020 as compared to the 2002 fleet. The Pavley II standards were developed by linking the GHG emissions and formerly separate toxic tailpipe emissions standards previously known as the "LEV III" (third stage of the Low Emission Vehicle standards) into a single regulatory framework. The new rules reduce emissions from gasoline-powered cars as well as promote zero-emissions auto technologies such as electricity and hydrogen, and through increasing the infrastructure for fueling hydrogen vehicles. In 2009, the U.S. EPA granted California the authority to implement the GHG standards for passenger cars, pickup trucks and sport utility vehicles and these GHG emissions standards are currently being implemented nationwide. However, EPA has performed a midterm evaluation of the longer-term standards for model years 2022-2025, and based on the findings of this midterm evaluation, the EPA has proposed to amend the corporate average fuel economy (CAFE) and GHG emissions standards for light vehicles for model years 2021 through 2026. The EPA's proposed amendments do not include any extension of the legal waiver granted to California by the 1970 Clean Air Act and which has allowed the State to set tighter standards for vehicle pipe emissions than the EPA standards. On September 20, 2019, California filed suit over the EPA decision to revoke California's legal waiver that has been joined by 22 other states.

5.2 Local – Imperial County

The Imperial County General Plan Renewable Energy and Transmission Element addresses energy conservation. The General Plan Goals and Policies identified below, address energy conservation.

Table D – Imperial County General Plan Energy Conservation Goals, Objectives and Policies

Goal, Objective, and Polices	General Plan	
Goal 1	Support the safe and orderly development of renewable energy while providing for the	
	protection of environmental resources. The County of Imperial supports the overall goals of the Desert Renewable Energy	
Objective 1.1	Conservation Plan to provide a balance between the development of renewable energy	
	resources while preserving sensitive environmental resources within its jurisdiction.	
Objective 1.2	Lessen impacts of site and design production facilities on agricultural, natural, and cultural resources.	
Objective 1.3	Require the use of directional geothermal drilling and "islands" when technically advisable in irrigated agricultural soils and sensitive or unique biological areas.	
Objective 1.4	Analyze potential impacts on agricultural, natural, and cultural resources, as appropriate.	
Objective 1.5	Analyze potential impacts on agricultural, natural, and cultural resources, as appropriate.	
Objective 1.6	Encourage the efficient use of water resources required in the operation of renewable energy generation facilities.	
Objective 1.7	Assure that development of renewable energy facilities and transmission lines comply with Imperial County Air Pollution Control District's regulations and mitigation measures.	
Goal 2	Encourage development of electrical transmission lines along routes which minimize potential environmental effects.	
	To the extent practicable, maximize utilization of IID's transmission capacity in existing	
Objective 2.1	easements or rights-of-way. Encourage the location of all major transmission lines within	
Objective 2.1	designated corridors, easements, and rights-of-way.	
	Where practicable and cost-effective, design transmission lines to minimize impacts on	
Objective 2.2	agricultural, natural, and cultural resources, urban areas, military operation areas, and recreational activities.	
Goal 3	Support development of renewable energy resources that will contribute to and enhance the economic vitality of Imperial County.	
	Preserve IID's Balancing Authority and local rate-making authority which allows IID to	
Objective 3.1	continue to provide low-cost service. Lower energy rates enhance the economic vitality in Imperial County.	
Objective 3.2	Encourage the continued development of the mineral extraction/production industry for job development using geothermal brines from the existing and future geothermal flash power plants.	
Objective 3.3	Encourage the development of services and industries associated with renewable energy facilities.	
Objective 3.4	Assure that revenues projected from proposed renewable energy facility developments are sufficient to offset operational costs to the County from that particular development.	
Objective 3.5	Encourage employment of County residents by the renewable energy industries wherever and whenever possible.	
Objective 3.6	Encourage the establishment of necessary and applicable renewable energy training programs in local school systems in association with the renewable energy industry.	
Objective 3.7	Evaluate environmental justice issues associated with job creation and displacement when considering the approval of renewable energy projects.	
Goal 4	Support development of renewable energy resources that will contribute to the restoration efforts of the Salton Sea.	
Objective 4.1	Prioritize the Salton Sea exposed seabed (playa) for renewable energy Development.	

Goal, Objective, and Polices	General Plan	
Objective 4.2	Encourage the development of renewable energy facilities that will contribute to the	
	reduction or elimination of airborne pollutants created by exposure of the seabed of the	
Objective 4.2	Salton Sea as it recedes.	
Objective 4.3	Develop mitigation measures and monitoring programs to minimize impacts to avian species and other species that may be affected by renewable energy facilities constructed	
	near the Salton Sea.	
Goal 5	Encourage development of innovative renewable energy technologies that will diversify Imperial County's energy portfolio.	
Objective 5.1	Support the implementation of pilot projects intended to test or demonstrate new and innovative renewable energy production technologies.	
Objective 5.2	Encourage development of utility-scale distributed generation projects in the County.	
Goal 6	Support development of renewable energy while providing for the protection of military aviation and operations.	
Objective 6.1	Assure that renewable energy facilities proposed in areas adjacent to military installations and training areas will be compatible with these uses.	
Objective 6.2	Facilitate the early exchange of project-related information with the military for proposed renewable energy facilities located within a military operations area (MOA) or within 1,000	
	feet of a military installation.	
Objective 6.3	Assure that renewable energy facilities proposed within MOAs will not jeopardize the	
	safety of existing residents or impact military operations.	
Goal 7	Actively minimize the potential for land subsidence to occur as a result of renewable	
Objective 7.1	energy operations. Require that all renewable energy facilities, where deemed appropriate, include design	
Objective 7.1	features that will prevent subsidence and other surface conditions from impacting existing land uses.	
Objective 7.2	For geothermal energy development facilities, establish injection standards consistent with	
	the requirements of the California Division of Oil, Gas, and Geothermal Resources	
	(CDOGGR). Request a CDOGGR subsidence review, if necessary, for consideration prior to	
<u> </u>	setting injection standards.	
Objective 7.3	Require renewable energy facility permittees to establish and monitor subsidence	
Objective 7.4	detection networks in areas affected by permitted project activities. Require monitoring programs for determining the possibility or extent of induced	
Objective 7.4	subsidence.	
Objective 7.5	Require corrective measures, in proportion to each developer's activities, if evidence	
•	indicates that operation of geothermal energy facilities have caused, or will cause, surface	
	impacts. In determining monitoring or mitigation requirements, the County shall consult	
	with informed parties such as CDOGGR, County Department of Public Works, the IID, the	
	permittee, other developers, and other experts as appropriate.	
Objective 7.6	Where geothermal fields have been divided into units or developers have established a	
	cooperative agreement for reservoir management, specific production and injection	
	requirements of individually permitted projects may be modified in accordance with both	
Objective 7.7	Federal and State requirements. Require seismic monitoring be performed in conjunction with major geothermal projects.	
Objective 7.8	Require operators of geothermal facilities analyze seismic data to determine the effects of	
,	geothermal production and injection on seismic activities within the development area.	
Objective 7.9	Consult with experts, such as CDOGGR, U.S. Geological Survey, geothermal industry	
•	representatives, permittees, and other developers to determine appropriate monitoring and mitigation requirements.	

Goal, Objective, and Polices	General Plan
Objective 7.10	Require operators of geothermal facilities to establish a notification system to warn or notify surrounding residents of the accidental release of potentially harmful emissions as part of an emergency response plan.
Objective 7.11	Require all geothermal energy facilities to include operating procedures that would prevent detrimental impacts to geothermal reservoirs.
Goal 8	Develop overlay zones that will facilitate the development of renewable energy resources while preserving and protecting agricultural, natural, and cultural resources. Development of overlay zones shall include coordination with Federal, State, County, Tribal governments, educational entities, the public and local industries.
Objective 8.1	Allow for County review with appropriate development and performance standards for development of local resources within the overlay zones.
Objective 8.2	Promote the exchange of information concerning renewable energy development to be circulated between industry, County staff, and the public.
Objective 8.3	Provide the public adequate opportunity to obtain information on the current status of renewable energy development and to provide input on matters related to the development of renewable energy resources.

Source: County of Imperial General Plan, 2015.

6.0 GLOBAL CLIMATE CHANGE MANAGEMENT

The regulatory setting related to global climate change is addressed through the efforts of various international, federal, state, regional, and local government agencies. These agencies work jointly, as well as individually, to reduce GHG emissions through legislation, regulations, planning, policy-making, education, and a variety of programs. The agencies responsible for global climate change regulations are discussed below.

6.1 International

In 1988, the United Nations established the IPCC to evaluate the impacts of global climate change and to develop strategies that nations could implement to curtail global climate change. In 1992, the United States joined other countries around the world in signing the United Nations' Framework Convention on Climate Change (UNFCCC) agreement with the goal of controlling GHG emissions. The parties of the UNFCCC adopted the Kyoto Protocol, which set binding GHG reduction targets for 37 industrialized countries, the objective of reducing their collective GHG emissions by five percent below 1990 levels by 2012. The Kyoto Protocol has been ratified by 182 countries, but has not been ratified by the United States. It should be noted that Japan and Canada opted out of the Kyoto Protocol and the remaining developed countries that ratified the Kyoto Protocol have not met their Kyoto targets. The Kyoto Protocol expired in 2012 and the amendment for the second commitment period from 2013 to 2020 has not yet entered into legal force. The Parties to the Kyoto Protocol negotiated the Paris Agreement in December 2015, agreeing to set a goal of limiting global warming to less than 2 degrees Celsius compared with preindustrial levels. The Paris Agreement has been adopted by 195 nations with 147 ratifying it, including the United States by President Obama, who ratified it by Executive Order on September 3, 2016. On June 1, 2017, President Trump announced that the United States is withdrawing from the Paris Agreement and on January 21, 2021 President Biden signed an executive order rejoining the Paris Agreement.

Additionally, the Montreal Protocol was originally signed in 1987 and substantially amended in 1990 and 1992. The Montreal Protocol stipulates that the production and consumption of compounds that deplete ozone in the stratosphere—CFCs, halons, carbon tetrachloride, and methyl chloroform—were to be phased out, with the first three by the year 2000 and methyl chloroform by 2005.

6.2 Federal – United States Environmental Protection Agency

The United States Environmental Protection Agency (EPA) is responsible for implementing federal policy to address global climate change. The Federal government administers a wide array of public-private partnerships to reduce U.S. GHG intensity. These programs focus on energy efficiency, renewable energy, methane, and other non-CO₂ gases, agricultural practices and implementation of technologies to achieve GHG reductions. EPA implements several voluntary programs that substantially contribute to the reduction of GHG emissions.

In Massachusetts v. Environmental Protection Agency (Docket No. 05–1120), argued November 29, 2006 and decided April 2, 2007, the U.S. Supreme Court held that not only did the EPA have authority to regulate greenhouse gases, but the EPA's reasons for not regulating this area did not fit the statutory requirements. As such, the U.S. Supreme Court ruled that the EPA should be required to regulate CO2 and other greenhouse gases as pollutants under the federal Clean Air Act (CAA).

In response to the FY2008 Consolidations Appropriations Act (H.R. 2764; Public Law 110-161), EPA proposed a rule on March 10, 2009 that requires mandatory reporting of GHG emissions from large sources in the United States. On September 22, 2009, the Final Mandatory Reporting of GHG Rule was signed and published in the Federal Register on October 30, 2009. The rule became effective on December 29, 2009. This rule requires suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions to submit annual reports to EPA.

On December 7, 2009, the EPA Administrator signed two distinct findings under section 202(a) of the Clean Air Act. One is an endangerment finding that finds concentrations of the six GHGs in the atmosphere threaten the public health and welfare of current and future generations. The other is a cause or contribute finding, that finds emissions from new motor vehicles and new motor vehicle engines contribute to the GHG pollution which threatens public health and welfare. These actions did not impose any requirements on industry or other entities, however, since 2009 the EPA has been providing GHG emission standards for vehicles and other stationary sources of GHG emissions that are regulated by the EPA. On September 13, 2013 the EPA Administrator signed 40 CFR Part 60, that limits emissions from new sources to 1,100 pounds of CO₂ per mega-watt hour (MWh) for fossil fuel-fired utility boilers and 1,000 pounds of CO₂ per MWh for large natural gas-fired combustion units.

On April 30, 2020, the EPA and the National Highway Safety Administration published the Final Rule for the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks (SAFE Vehicles Rule). Part One of the Rule revokes California's authority to set its own GHG emissions standards and zero-emission vehicle mandates in California, which results in one emission standard to be used nationally for all passenger cars and light trucks that is set by the EPA.

6.3 State

The California Air Resources Board (CARB) has the primary responsible for implementing state policy to address global climate change, however there are State regulations related to global climate change that affect a variety of State agencies. CARB, which is a part of the California Environmental Protection Agency, is responsible for the coordination and administration of both the federal and state air pollution control programs within California. In this capacity, the CARB conducts research, sets California Ambient Air Quality Standards (CAAQS), compiles emission inventories, develops suggested control measures, provides oversight of local programs, and prepares the SIP. In addition, the CARB establishes emission standards for motor vehicles sold in California, consumer products (e.g. hairspray, aerosol paints, and barbeque lighter fluid), and various types of commercial equipment. It also sets fuel specifications to further reduce vehicular emissions.

In 2008, CARB approved a Climate Change Scoping Plan that proposes a "comprehensive set of actions designed to reduce overall carbon GHG emissions in California, improve our environment, reduce our dependence on oil, diversify our energy sources, save energy, create new jobs, and enhance public health" (CARB 2008). The Climate Change Scoping Plan has a range of GHG reduction actions which include direct regulations; alternative compliance mechanisms; monetary and non-monetary incentives; voluntary actions; market-based mechanisms such as a cap-and-trade system. In 2014, CARB approved the First Update to the Climate Change Scoping Plan (CARB 2014) that identifies additional strategies moving beyond the 2020 targets to the year 2050. On December 14, 2017 CARB adopted the California's 2017 Climate Change Scoping Plan, November 2017 (CARB 2017) that provides specific statewide policies and measures to achieve the 2030 GHG reduction target of 40 percent below 1990 levels by 2030 and the

aspirational 2050 GHG reduction target of 80 percent below 1990 levels by 2050. In addition, the State has passed the following laws directing CARB to develop actions to reduce GHG emissions, which are listed below in chronological order, with the most current first.

Executive Order N-79-20

The California Governor issued Executive Order N-79-20 on September 23, 2020 that requires all new passenger cars and trucks and commercial drayage trucks sold in California to be zero-emissions by the year 2035 and all medium- heavy-duty vehicles (commercial trucks) sold in the state to be zero-emission by 2045 for all operations where feasible. Executive Order N-79-20 also requires all off-road vehicles and equipment to transition to 100 percent zero-emission equipment, where feasible by 2035.

California Code of Regulations (CCR) Title 24, Part 6

The Title 24 Part 6 standards have been developed by the CEC primarily for energy conservation and is described in more detail above in Section 5.1 under Energy Conservation Management. It should be noted that implementation of the Title 24 Part 6 building standards would also reduce GHG emissions, since as detailed above in Section 3.3 Greenhouse Gas Emissions Inventory, energy use for residential and commercial buildings creates 9.7 percent of the GHG emissions in the State.

California Code of Regulations (CCR) Title 24, Part 11

The CalGreen Building standards have been developed by the CEC primarily for energy conservation and is described in more detail above in Section 5.1 under Energy Conservation Management. It should be noted that implementation of the CalGreen Building standards would also reduce GHG emissions, since as detailed above under Title 23, Part 6, energy usage from buildings creates 9.7 percent of GHG emissions in the State.

Senate Bill 100

SB 100 requires that by December 1, 2045 that 100 percent of retail sales of electricity to be generated from renewable or zero-carbon emission sources of electricity and is described in more detail above in Section 5.1 under Energy Conservation Management.

Executive Order B-48-18 and Assembly Bill 2127

Executive Order B-48-18 and AB 2127 provides measures to put at least five million zero-emission vehicles on California roads by 2030 and to install 200 hydrogen fueling stations and 250,000 electric vehicle chargers by 2025 and is described in more detail above in Section 5.1 under Energy Conservation Management.

Executive Order B-30-15, Senate Bill 32 and Assembly Bill 197

The California Governor issued Executive Order B-30-15 on April 29, 2015 that aims to reduce California's GHG emissions 40 percent below 1990 levels by 2030. This executive order aligns California's GHG reduction targets with those of other international governments, such as the European Union that set the same target for 2030 in October, 2014. This target will make it possible to reach the ultimate goal of reducing GHG emissions 80 percent under 1990 levels by 2050 that is based on scientifically established levels needed in the U.S.A to limit global warming below 2 degrees Celsius – the warming threshold at which scientists say there will likely be major climate disruptions such as super droughts and rising sea levels. Assembly Bill 197 (AB 197) (September 8, 2016) and Senate Bill 32 (SB 32) (September 8, 2016) codified into statute the GHG emissions reduction targets of at least 40 percent below 1990 levels by 2030

as detailed in Executive Order B-30-15. AB 197 also requires additional GHG emissions reporting that is broken down to sub-county levels and requires CARB to consider the social costs of emissions impacting disadvantaged communities.

Executive Order B-29-15

The California Governor issued Executive Order B-29-15 on April 1, 2015 and directed the State Water Resources Control Board to impose restrictions to achieve a statewide 25% reduction in urban water usage and directed the Department of Water Resources to replace 50 million square feet of lawn with drought tolerant landscaping through an update to the State's Model Water Efficient Landscape Ordinance. The Ordinance also requires installation of more efficient irrigation systems, promotion of greywater usage and onsite stormwater capture, and limits the turf planted in new residential landscapes to 25 percent of the total area and restricts turf from being planted in median strips or in parkways unless the parkway is next to a parking strip and a flat surface is required to enter and exit vehicles. Executive Order B-29-15 would reduce GHG emissions associated with the energy used to transport and filter water.

Assembly Bill 341 and Senate Bills 939 and 1374

Senate Bill 939 (SB 939) requires that each jurisdiction in California to divert at least 50 percent of its waste away from landfills, whether through waste reduction, recycling or other means. Senate Bill 1374 (SB 1374) requires the California Integrated Waste Management Board to adopt a model ordinance by March 1, 2004 suitable for adoption by any local agency to require 50 to 75 percent diversion of construction and demolition of waste materials from landfills. Assembly Bill 341 (AB 341) was adopted in 2011 and builds upon the waste reduction measures of SB 939 and 1374, and sets a new target of a 75 percent reduction in solid waste generated by the year 2020.

Senate Bill 375

Senate Bill 375 (SB 375) was adopted September 2008 in order to support the State's climate action goals to reduce GHG emissions through coordinated regional transportation planning efforts, regional GHG emission reduction targets, and land use and housing allocation. SB 375 requires CARB to set regional targets for GHG emissions reductions from passenger vehicle use. In 2010, CARB established targets for 2020 and 2035 for each Metropolitan Planning Organizations (MPO) within the State. It was up to each MPO to adopt a sustainable communities strategy (SCS) that will prescribe land use allocation in that MPOs Regional Transportation Plan (RTP) to meet CARB's 2020 and 2035 GHG emission reduction targets. These reduction targets are required to be updated every eight years. The most recent targets³ provide GHG emissions reduction targets for SCAG of 8 percent by 2020 and 19 percent by 2035.

The Connect SoCal (SCAG 2020) provides a 2035 GHG emission reduction target of 19 percent reduction over the 2005 per capita emissions levels. The Connect SoCal include new initiatives of land use, transportation and technology to meet the new 19 percent GHG emission reduction target for 2035. CARB is also charged with reviewing SCAG's RTP/SCS for consistency with its assigned targets.

City and County land use policies, including General Plans, are not required to be consistent with the RTP and associated SCS. However, new provisions of CEQA incentivize, through streamlining and other

³ Obtained from: https://ww2.arb.ca.gov/our-work/programs/sustainable-communities-program/regional-plan-targets

provisions, qualified projects that are consistent with an approved SCS and categorized as "transit priority projects."

Assembly Bill 1109

AB 1109 requires reductions in energy usage for lighting and is described in more detail above in Section 5.1 under Energy Conservation Management.

Executive Order S-1-07

Executive Order S-1-07 was issued in 2007 and proclaims that the transportation sector is the main source of GHG emissions in the State, since it generates more than 40 percent of the State's GHG emissions. It establishes a goal to reduce the carbon intensity of transportation fuels sold in the State by at least ten percent by 2020. This Executive Order also directs CARB to determine whether this Low Carbon Fuel Standard (LCFS) could be adopted as a discrete early-action measure as part of the effort to meet the mandates in AB 32.

In 2009 CARB approved the proposed regulation to implement the LCFS. The standard was challenged in the courts, but has been in effect since 2011 and was re-approved by the CARB in 2015. The LCFS is anticipated to reduce GHG emissions by about 16 MMT per year by 2020. The LCFS is designed to provide a framework that uses market mechanisms to spur the steady introduction of lower carbon fuels. The framework establishes performance standards that fuel producers and importers must meet annually. Reformulated gasoline mixed with corn-derived ethanol and low-sulfur diesel fuel represent the baseline fuels. Lower carbon fuels may be ethanol, biodiesel, renewable diesel, or blends of these fuels with gasoline or diesel. Compressed natural gas and liquefied natural gas also may be low-carbon fuels. Hydrogen and electricity, when used in fuel cells or electric vehicles, are also considered as low-carbon fuels.

Senate Bill 97

Senate Bill 97 (SB 97) was adopted August 2007 and acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. SB 97 directed the Governor's Office of Planning and Research (OPR), which is part of the State Natural Resources Agency, to prepare, develop, and transmit to CARB guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, as required by CEQA, by July 1, 2009. The Natural Resources Agency was required to certify and adopt those guidelines by January 1, 2010.

Pursuant to the requirements of SB 97 as stated above, on December 30, 2009 the Natural Resources Agency adopted amendments to the State CEQA guidelines that addresses GHG emissions. The CEQA Guidelines Amendments changed 14 sections of the CEQA Guidelines and incorporated GHG language throughout the Guidelines. However, no GHG emissions thresholds of significance were provided and no specific mitigation measures were identified. The GHG emission reduction amendments went into effect on March 18, 2010 and are summarized below:

- Climate Action Plans and other greenhouse gas reduction plans can be used to determine whether a project has significant impacts, based upon its compliance with the plan.
- Local governments are encouraged to quantify the GHG emissions of proposed projects, noting
 that they have the freedom to select the models and methodologies that best meet their needs
 and circumstances. The section also recommends consideration of several qualitative factors that
 may be used in the determination of significance, such as the extent to which the given project

complies with state, regional, or local GHG reduction plans and policies. OPR does not set or dictate specific thresholds of significance. Consistent with existing CEQA Guidelines, OPR encourages local governments to develop and publish their own thresholds of significance for GHG impacts assessment.

- When creating their own thresholds of significance, local governments may consider the thresholds of significance adopted or recommended by other public agencies, or recommended by experts.
- New amendments include guidelines for determining methods to mitigate the effects of GHG emissions in Appendix F of the CEQA Guidelines.
- OPR is clear to state that "to qualify as mitigation, specific measures from an existing plan must be identified and incorporated into the project; general compliance with a plan, by itself, is not mitigation."
- OPR's emphasizes the advantages of analyzing GHG impacts on an institutional, programmatic level. OPR therefore approves tiering of environmental analyses and highlights some benefits of such an approach.
- Environmental impact reports must specifically consider a project's energy use and energy efficiency potential.

Assembly Bill 32

In 2006, the California State Legislature adopted AB 32, the California Global Warming Solutions Act of 2006. AB 32 requires CARB, to adopt rules and regulations that would achieve GHG emissions equivalent to statewide levels in 1990 by 2020 through an enforceable statewide emission cap which will be phased in starting in 2012. Emission reductions shall include carbon sequestration projects that would remove carbon from the atmosphere and utilize best management practices that are technologically feasible and cost effective.

In 2007 CARB released the calculated Year 1990 GHG emissions of 431 MMTCO₂e. The 2020 target of 431 MMTCO₂e requires the reduction of 78 MMTCO₂e, or approximately 16 percent from the State's projected 2020 business as usual emissions of 509 MMTCO₂e (CARB 2014). Under AB 32, CARB was required to adopt regulations by January 1, 2011 to achieve reductions in GHGs to meet the 1990 cap by 2020. Early measures CARB took to lower GHG emissions included requiring operators of the largest industrial facilities that emit 25,000 metric tons of CO_2 in a calendar year to submit verification of GHG emissions by December 1, 2010. The CARB Board also approved nine discrete early action measures that include regulations affecting landfills, motor vehicle fuels, refrigerants in cars, port operations and other sources, all of which became enforceable on or before January 1, 2010.

CARB's Scoping Plan that was adopted in 2009, proposes a variety of measures including: strengthening energy efficiency and building standards; targeted fees on water and energy use; a market-based capand-trade system; achieving a 33 percent renewable energy mix; and a fee regulation to fund the program. The 2014 update to the Scoping Plan identifies strategies moving beyond the 2020 targets to the year 2050.

The Cap-and-Trade Program established under the Scoping Plan sets a statewide limit on sources responsible for 85 percent of California's GHG emissions, and has established a market for long-term investment in energy efficiency and cleaner fuels since 2012.

Executive Order S-3-05

In 2005 the California Governor issued Executive Order S 3-05, GHG Emission, which established the following reduction targets:

- 2010: Reduce greenhouse gas emissions to 2000 levels;
- 2020: Reduce greenhouse gas emissions to 1990 levels;
- 2050: Reduce greenhouse gas emissions to 80 percent below 1990 levels.

The Executive Order directed the secretary of the California Environmental Protection Agency (CalEPA) to coordinate a multi-agency effort to reduce GHG emissions to the target levels. To comply with the Executive Order, the secretary of CalEPA created the California Climate Action Team (CAT), made up of members from various state agencies and commissions. The team released its first report in March 2006. The report proposed to achieve the targets by building on the voluntary actions of businesses, local governments, and communities and through State incentive and regulatory programs. The State achieved its first goal of reducing GHG emissions to 2000 levels by 2010.

Assembly Bill 1493

AB 1493 or the Pavley Bill sets tailpipe GHG emissions limits for passenger vehicles in California as well as fuel economy standards and is described in more detail above in Section 5.1 under Energy Conservation Management.

6.4 Local – Imperial County

The ICAPCD develops rules and regulations, establishes permitting requirements for stationary sources, inspects emission sources, and enforces such measures through educational programs or fines, when necessary. ICAPCD is directly responsible for reducing emissions from stationary, mobile, and indirect sources. The ICAPCD has not established formal quantitative or qualitative GHG emissions thresholds through a public rulemaking process. However, the ICAPCD has adopted the Federal PSD and Title V GHG air permitting requirements by reference for stationary sources in Regulation IX in Rules 900 and 903, which are described below.

ICAPCD Rule 900

ICAPCD Rule 900 provides procedures for issuing permits to operate for industrial projects that are subject to Title V of the Federal Clean Air Act Amendments of 1990 (Major Sources) of emissions, which is defined as a source that exceeds 100 tons per year of any regulated pollutant, including GHG emissions.

ICAPCD Rule 903

ICAPCD Rule 903 applies to any stationary source that would have the potential to emit hazardous air pollutants (HAPs). Rule 903 provides a de minimis emissions level of 20,000 tons of CO2e per year, where a stationary source that produces less emissions than the de minimis emissions levels, the source is exempt from the Rule 903 recordkeeping and reporting requirements.

7.0 ATMOSPHERIC SETTING

7.1 Regional Climate

The Project site is located within the central portion of Imperial County, which is part of the Salton Sea Air Basin (Air Basin). The Air Basin comprises the central portion of Riverside County and all of Imperial County. The Riverside County portion of the Air Basin is regulated by the South Coast Air Quality Management District (SCAQMD), and the Imperial County portion of the Air Basin is regulated by the Imperial County Air Pollution Control District (ICAPCD).

Air quality is a function of both the rate and location of pollutant emissions under the influence of meteorological conditions and topographical features. Atmospheric conditions such as wind speed, wind direction, and air temperature gradients interact with physical features of the landscape to determine their movement and dispersal, and, consequently, their effect on air quality. The combination of topography and inversion layers generally prevents dispersion of air pollutants in the Air Basin. The following description of climate of Imperial County was obtained from Imperial County 2018 Redesignation Request and Maintenance Plan for Particulate Matter less than 10 Microns in Diameter, prepared by ICAPCD, October 23, 2018.

The climate of Imperial County is governed by the large-scale sinking and warming of air in the semi-permanent high-pressure zone of the eastern Pacific Ocean. The high-pressure ridge blocks out most mid-latitude storms, except in the winter, when it is weakest and located farthest south. The coastal mountains prevent the intrusion of any cool, damp air found in California coastal areas. Because of the barrier and weakened storms, Imperial County experiences clear skies, extremely hot summers, mild winters, and little rainfall. The sun shines, on the average, more in Imperial County than anywhere else in the United States.

Winters are mild and dry with daily average temperatures ranging between 65- and 75- degrees Fahrenheit (°F). During winter months it is not uncommon to record maximum temperatures of up to 80 °F. Summers are extremely hot with daily average temperatures ranging between 104 and 115 °F. It is not uncommon to record maximum temperatures of 120 °F during summer months.

The flat terrain of the valley and the strong temperature differentials created by intense solar heating, produce moderate winds and deep thermal convection. The combination of subsiding air, protective mountains, and distance from the ocean all combine to severely limit precipitation. Rainfall is highly variable, with precipitation from a single heavy storm able to exceed the entire annual total during a later drought condition. The average annual rainfall is just over three 3 inches, with most of it occurring in late summer or mid-winter.

Humidity is low throughout the year, ranging from an average of 28 percent in summer to 52 percent in winter. The large daily oscillation of temperature produces a corresponding large variation in the relative humidity. Nocturnal humidity rises to 50 to 60 percent but drops to about 10 percent during the day.

The wind in Imperial County follows two general patterns. Wind statistics indicate prevailing winds are from the west-northwest through southwest; a secondary flow maximum from the southeast is also evident. The prevailing winds from the west and northwest occur seasonally from fall through spring and are known to be from the Los Angeles area. Occasionally, Imperial County experiences periods of extremely high wind speeds. Wind speeds can exceed 31 miles per hour (mph), and this occurs most

frequently during the months of April and May. However, speeds of less than 6.8 mph account for more than one-half of the observed wind measurements.

7.2 Monitored Local Air Quality

The air quality at any site is dependent on the regional air quality and local pollutant sources. The air quality at any location in the Air Basin is determined by the release of pollutants throughout the Air Basin as well as from air pollutants that travel from the coastal areas and Mexico to the Air Basin. The ICAPCD operates a network of monitoring stations throughout the County that continuously monitor ambient levels of criteria pollutants in compliance with federal monitoring regulations.

Since not all air monitoring stations measure all of the tracked pollutants, the data from the following two monitoring stations, listed in the order of proximity to the Project site, have been used: Brawley-220 Main Street Monitoring Station (Brawley Station), Westmorland Monitoring Station (Westmorland Station) and El Centro – 9th Street Monitoring Station (El Centro Station)

The Brawley Station is located approximately 2.9 miles south of the project site at 220 Main Street, Brawley, the Westmorland Station is located approximately 6.4 miles west of the project site at 202 W First Street, Westmorland, and the El Centro Station is located approximately 15.7 miles south of the project site at 150 9th Street, El Centro. PM10 and PM2.5 were measured at the Brawley Station, ozone was measured at the Westmorland Station, and NO₂ was measured at the El Centro Station. It should be noted that due to the air monitoring stations' distances from the project site, recorded air pollution levels at the air monitoring stations reflect with varying degrees of accuracy local air quality conditions at the project site.

Table E and shows the most recent three years of monitoring data from CARB. CO measurements have not been provided, since CO is currently in attainment in the Air Basin and monitoring of CO within the Air Basin ended on March 31, 2013.

Table E – Local Area Air Quality Monitoring Summary

		Year ¹	
Pollutant (Standard)	2018	2019	2020
Ozone: 1			
Maximum 1-Hour Concentration (ppm)	0.086	0.071	0.067
Days > CAAQS (0.09 ppm)	0	0	0
Maximum 8-Hour Concentration (ppm)	0.068	0.060	0.059
Days > NAAQS (0.070 ppm)	0	0	0
Days > CAAQs (0.070 ppm)	0	0	0
Nitrogen Dioxide: 2			
Maximum 1-Hour Concentration (ppb)	34.1	41.4	44.8
Days > NAAQS (100 ppb)	0	0	0
Days > CAAQS (180 ppb)	0	0	0
Inhalable Particulates (PM10): ³			
Maximum 24-Hour National Measurement (ug/m³)	407.0	324.4	166.0

		Year ¹	
Pollutant (Standard)	2018	2019	2020
Days > NAAQS (150 ug/m³)	13	2	2
Days > CAAQS (50 ug/m ³)	106	53	73
Annual Arithmetic Mean (AAM) (ug/m³)	52.2	35.8	39.0
Annual > NAAQS (50 ug/m³)	Yes	No	No
Annual > CAAQS (20 ug/m³)	Yes	Yes	Yes
Ultra-Fine Particulates (PM2.5): ³			
Maximum 24-Hour National Measurement (ug/m³)	55.1	28.9	23.7
Days > NAAQS (35 ug/m³)	2	0	0
Annual Arithmetic Mean (AAM) (ug/m³)	10.4	8.3	9.4
Annual > NAAQS and CAAQS (12 ug/m³)	No	No	No

Notes: Exceedances are listed in **bold.** CAAQS = California Ambient Air Quality Standard; NAAQS = National Ambient Air Quality Standard; ppm = parts per million; ppb = parts per billion; ND = no data available.

Source: http://www.arb.ca.gov/adam/

Ozone

During the last three years, the State 1-hour and 8-hour concentration standards for ozone have not been exceeded at the Westmorland Station. The Federal 8-hour ozone standard has not been exceeded over the last three years at the Westmorland Station. Ozone is a secondary pollutant as it is not directly emitted. Ozone is the result of chemical reactions between other pollutants, most importantly hydrocarbons and NO₂, which occur only in the presence of bright sunlight. Pollutants emitted from upwind cities react during transport downwind to produce the oxidant concentrations experienced in the area. Many areas of Southern California contribute to the ozone levels experienced at this monitoring station, with the more significant areas being those directly upwind.

Nitrogen Dioxide

The El Centro Station did not record an exceedance of either the Federal or State 1-hour NO₂ standards for the last three years.

Particulate Matter

The State 24-hour concentration standard for PM10 has been exceeded between 53 and 106 days per year over the past three years at the Brawley Station. Over the past three years the Federal 24-hour standard for PM10 has been exceeded between 2 and 13 days per year over the past three years at the Brawley Station. The annual PM10 concentration at the Brawley Station has exceeded the State standard for the past three years and has exceeded the Federal standard for only one of the past three years.

Over the past three years the 24-hour concentration standard for PM2.5 has been exceeded between 0 and 2 days each year over the past three years at the Brawley Station. The annual PM2.5 concentrations at the Brawley Station has not exceeded either the State or Federal standard for the past three years. Particulate levels in the area are due to natural sources, grading operations, and motor vehicles.

¹ Data obtained from the Westmorland Station.

 $^{^{\}rm 2}\,$ Data obtained from the El Centro Station.

³ Data obtained from the Brawley Station.

According to the EPA, some people are much more sensitive than others to breathing fine particles (PM10 and PM2.5). People with influenza, chronic respiratory and cardiovascular diseases, and the elderly may suffer worsening illness and premature death due to breathing these fine particles. People with bronchitis can expect aggravated symptoms from breathing in fine particles. Children may experience decline in lung function due to breathing in PM10 and PM2.5. Other groups considered sensitive are smokers and people who cannot breathe well through their noses. Exercising athletes are also considered sensitive, because many breathe through their mouths during exercise.

8.0 MODELING PARAMETERS AND ASSUMPTIONS

8.1 CalEEMod Model Input Parameters

The criteria air pollution and GHG emissions impacts created by the proposed project have been analyzed through use of CalEEMod Version 2020.4.0. CalEEMod is a computer model published by the SCAQMD for estimating air pollutant emissions. The CalEEMod program uses the EMFAC2017 computer program to calculate the emission rates specific for Imperial County for employee, vendor and haul truck vehicle trips and the OFFROAD2011 computer program to calculate emission rates for heavy equipment operations. EMFAC2017 and OFFROAD2011 are computer programs generated by CARB that calculates composite emission rates for vehicles. Emission rates are reported by the program in grams per trip and grams per mile or grams per running hour.

The project characteristics in the CalEEMod model were set to a project location of Imperial County, a Climate Zone of 10, and utility company of Imperial Irrigation District. and an opening year of 2023 was utilized in this analysis.

Land Use Parameters

The proposed project would consist of development of a solar energy facility that would include installation of 106,652 PV panels, gen-tie lines via underground conduits onsite and a 1.6 mile long overhead power lines and possible fiber optic cable from southwest corner to the North Brawley 1 Substation, construction of the 100,800 square foot BESS building that would be located at the southwest corner of the project site, and construction of a 1.2-acre substation that would include an air conditioned control room with a 20 kV backup generator for the HVAC system. The proposed project's land use parameters that were entered into the CalEEMod model are shown in Table F.

Table F – CalEEMod Land Use Parameters

		Land Use	Lot	Building/Paving
Proposed Land Use	Land Use Subtype in CalEEMod	Size ¹	Acreage ²	(square feet)
Solar Panels	Other Non-Asphalt Surfaces	223.49 AC	223.49	9,735,224
BESS Building	Refrigerated Warehouse – No Rail	100.80 TSF	2.31	100,800
Substation	Manufacturing	52.27 TSF	1.20	52,270
Offsite Overhead Power Lines	Other Non-Asphalt Surfaces	9.7 AC	9.70	422,532

Notes:

Construction Parameters

Construction activities have been modeled as starting in December 2021 and taking eight months to complete. The phases of construction activities that have been analyzed are detailed below and include: 1) Site Preparation; 2) PV System Installation and Testing, and 3) Site Clean-up and Restoration.

The following On-Road Fugitive Dust construction parameters were revised in the CalEEMod model: (1) The percent on-road pavement was changed to 85 percent to account for Best Avenue that is adjacent to the project site being paved; and (2) The Material Silt Content was changed to 3 percent in order to

¹ DU = Dwelling Unit; AC = Acres

² Lot acreage calculated based on the total project site area of 227-acres and total offsite power line installation area of 9.7 acres (1.6 miles x 50 feet wide).

account for ICAPCD Rule 805 F.1.c that requires the installation of gravel or other low silt material with less than 5 percent silt content on all onsite roads.

The CalEEMod model provides the selection of "mitigation" to account for project conditions that would result in less emissions than a project without these conditions, however it should be noted that this "mitigation" may represent regulatory requirements. This includes: (1) Required adherence to ICAPCD Rule 801, which requires that the Best Available Control Measures be utilized to reduce fugitive dust emissions, that was modeled in CalEEMod with selection of mitigation of water all exposed areas two times per day; and (2) Required adherence to ICAPCD Rule 805 F.1.d that requires the application of water one or more times daily to unpaved roads that was modeled in CalEEMod with selection of Unpaved Road Mitigation of 7 percent moisture content and maximum vehicle speed of 15 miles per hour on unpaved roads. Since the 15 mile per hour speed on unpaved roads is not explicitly required in ICAPCD Rule 805, Project Design Feature 6 has been included in this analysis to ensure this limitation is adhered to.

Site Preparation

The site preparation phase would include the renovation of existing dirt roads to all-weather surfaces (to meet the County standards) from Best Avenue to the City of Brawley wastewater treatment plant. The site preparation phase would begin with clearing of existing brush and installation of fencing around the Project boundary. The site preparation phase is anticipated to start December 2021 and was based on occurring over one month. The site preparation phase would generate up to 240 worker trips per day. In addition, 6 vendor trips per day were added to the CalEEMod model, in order to account for water truck emissions. The onsite equipment was modeled as consisting of two bore/drill rigs, two excavators, three rubber-tired dozers, and four of either tractors, loaders, or backhoes.

PV System Installation and Testing

The PV system Installation and testing phase includes installation of mounting posts, assembling the structural components, mounting PV modules, and wiring. This phase would occur after completion of the site preparation phase and was modeled as occurring over six months. This phase was modeled as a Building Construction phase in CalEEMod. This phase would generate up to 240 worker trips per day and up to 300 vendor truck trips per day. The onsite equipment was modeled as consisting of two aerial lifts, one air compressor, two cranes, three forklifts, one generator set, one grader, two off-highway trucks, one welder, and three of either tractors, loaders, or backhoes.

Site Clean-up and Restoration

The site clean-up and restoration phase would include removal of all waste material and debris from the project site as shredding and distributing the previously cleared vegetation over the project site, and the roads would be left in a condition equal or better than their preconstruction condition. This phase would occur after the PV system installation phase and was modeled as occurring over one month. This phase was modeled as a Grading phase in CalEEMod. This phase would generate up to 240 worker trips per day. In addition, 6 vendor trips per day were added to the CalEEMod model, in order to account for water truck emissions. The onsite equipment was modeled as consisting of two graders, two rubber-tired dozers, two rubber-tired loaders, and two of either tractors, loaders, or backhoes.

Operational Emissions Modeling

Once fully constructed, the proposed project would be operated on an unstaffed basis and be monitored remotely from the Brawley Geothermal Power Plant control room, with periodic on-site personnel

visitations for security, maintenance and system monitoring. Therefore, no full-time site personnel would be required on-site during operations and employees would only be on-site up to four times per year to wash the panels. As the Project's PV arrays produce electricity passively, maintenance requirements are anticipated to be very minimal. Any required planned maintenance activities would generally consist of equipment inspection and replacement and would be scheduled to avoid peak load periods. Any unplanned maintenance would be responded to as needed, depending on the event.

The operations-related criteria air pollutant emissions and GHG emissions created by the proposed project have been analyzed through use of the CalEEMod model. The proposed project was analyzed in the CalEEMod model based on the land use parameters provided above and the parameters entered for each operational source is described below.

Mobile Sources

Mobile sources include emissions the additional vehicle miles generated from the proposed project. It is anticipated that the washing of the panels would generate up to 40 trips per day that would occur four times per year. However, in order to provide a worst-case analysis, it was assumed that these trips would occur once per week.

Area Sources

Area sources include emissions from consumer products, landscape equipment, and architectural coatings. Since no workers will typically be onsite, the consumer product emissions were set to zero. No other changes were made to the default area source parameters in the CalEEMod model.

Energy Usage

Energy usage includes emissions from electricity and natural gas used onsite. The natural gas emission rates were set to zero, since no natural gas will be used onsite. For electricity use, the proposed solar PV panels system is rated at 40 mega-watts (MW). Since the CalEEMod model requires that the total kilowatt-hours (kWh) per year generated by the solar panels be entered into the model, the 40 MW were converted to 40,000 kW panels and was then multiplied by 8 hours, to provide a conservative average hours per day of sunlight that the solar panels will generate electricity and then divided by 1.2 to account for the loss associated with converting the direct current (DC) power from the solar panels to the alternating current (AC) power on the electrical grid and then multiplying by 365 days, which resulted in the proposed solar panels generating 97,333,333 kilowatt-hours per year that was entered into the CalEEMod model under solar panel mitigation.

Since according to the BESS system specifications, the air conditioning units and power conversion associated with the proposed BESS will not use more than 2 percent of the electricity stored, the calculated 97,333,333 kWh generated by the solar panels was multiplied by 2 percent, which results in the proposed project utilizing 1,946,667 kWh per year that was entered into the CalEEMod.

Solid Waste

Waste includes the GHG emissions associated with the processing of waste from the proposed project as well as the GHG emissions from the waste once it is interred into a landfill. Since no workers would typically be onsite, no waste is anticipated to be generated from the project. As such, solid waste generation was set to zero in CalEEMod.

Water and Wastewater

According to the Project Description for the proposed project, estimated annual water consumption for operation and maintenance of the proposed Project, including periodic PV module washing, would be approximately 0.81-acre feet (263,939 gallons) annually, which would be trucked to the Project site as needed. As such, the water usage in CalEEMod was set to 263,939 gallons per year.

Backup Diesel Generator

The proposed project would include the installation of a 20 kW backup diesel-powered generator to provide continuous power to the control room and associated HVAC system for the proposed substation. Since the exact model has not yet been determined, a search for 20 kW diesel generators found that the horsepower ranges between 50 and 62 horsepower, and in order to provide a worst-case analysis, a 62 horsepower generator was analyzed in CalEEMod. Backup generators typically cycle on for 30 minutes on a weekly basis in order to keep the engine lubricated and ready to use in case of a power outage. The typical cycling of a backup generator would operate for approximately 26 hours per year. The backup diesel generator was modeled in CalEEMod based on a 62 horsepower engine, a 0.73 load factor, 0.5 hour per day, and 26 hours per year.

8.2 Energy Use Calculations

The proposed project is anticipated to consume energy during both construction and operation of the proposed project and the parameters utilized to calculate energy use from construction and operation of the proposed project are detailed separately below.

Construction-Related Energy Use

Construction of the proposed project is anticipated to use energy in the forms of petroleum fuel for both off-road equipment as well as from the transport of workers and materials to and from the project site and the calculations for each source are described below.

Off-Road Construction Equipment

The off-road construction equipment fuel usage was calculated through use of the CalEEMod model's default off-road equipment assumptions detailed above in Section 8.1. For each piece of off-road equipment, the fuel usage was calculated through use of the *2017 Off-road Diesel Emission Factors* spreadsheet, prepared by CARB⁴. The Spreadsheet provides the following formula to calculate fuel usage from off-road equipment:

Fuel Used = Load Factor x Horsepower x Total Operational Hours x BSFC / Unit Conversion

Where:

Load Factor - Obtained from CalEEMod default values

Horsepower – Obtained from CalEEMod default values

Total Operational Hours – Calculated by multiplying CalEEMod default daily hours by CalEEMod default number of working days for each phase of construction

BSFC – Brake Specific Fuel Consumption (pounds per horsepower-hour) – If less than 100 Horsepower = 0.408, if greater than 100 Horsepower = 0.367

⁴ Obtained from: https://ww3.arb.ca.gov/msei/ordiesel.htm

Unit Conversion – Converts pounds to gallons = 7.109

Table G shows the off-road construction equipment fuel calculations based on the above formula. Table G shows that the off-road equipment utilized during construction of the proposed project would consume 84,890 gallons of fuel.

Table G – Off-Road Equipment and Fuel Consumption from Construction of the Proposed Project

Equipment Type	Equipment Quantity	Horse- power	Load Factor	Operating Hours per Day	Total Operational Hours ¹	Fuel Used (gallons)
Site Preparation						
Bore/Drill Rig	2	221	0.50	8	368	2,110
Excavators	2	158	0.38	8	368	1,141
Rubber Tired Dozers	3	247	0.40	8	552	2,815
Tractors/Loaders/Backhoes	4	97	0.37	8	736	1,516
PV System Installation and Tes	ting					
Aerial Lifts	2	63	0.31	8	2,064	2,300
Air Compressor	1	78	0.48	8	1,032	2,218
Cranes	2	231	0.29	8	2,064	7,138
Forklifts	3	89	0.20	8	3,096	3,163
Generator Set	1	84	0.74	8	1,032	3,682
Graders	1	187	0.41	8	1,032	4,072
Off-Hwy Trucks	2	402	0.38	8	2,064	16,358
Tractors/Loaders/Backhoes	3	97	0.37	8	3,096	6,377
Welders	1	46	0.45	8	1,032	1,226
Site Clean-up and Restoration						
Graders	2	187	0.41	8	2,064	8,169
Rubber Tired Dozers	2	247	0.40	8	2,064	10,527
Rubber Tired Loaders	2	203	0.36	8	2,064	7,826
Tractors/Loaders/Backhoes	2	97	0.37	8	2,064	4,251
	Total Off-Ro	ad Equip	ment Fu	el Used during Cor	nstruction (gallons)	84,890

Notes:

On-Road Construction-Related Vehicle Trips

The on-road construction-related vehicle trips fuel usage was calculated through use of the construction vehicle trip assumptions from the CalEEMod model run as detailed above in Section 8.1. The calculated total construction miles was then divided by the fleet average for Imperial County miles per gallon rates for the 2021 calculated through of the EMFAC2017 year use (https://www.arb.ca.gov/emfac/2017/) and the EMFAC2017 model printouts are shown in Appendix B. The worker trips were based on the entire fleet average miles per gallon rate for gasoline powered vehicles and the vendor trips were based on the Heavy-Heavy Duty Truck (HHDT), Medium Duty Vehicle (MDV), and Medium Heavy-Duty Vehicle (MHDV) fleet average miles per gallon rate for diesel-powered vehicles. Table H shows the on-road construction vehicle trips modeled in CalEEMod and the fuel usage calculations.

¹ Based on: 23 days for Site Preparation; 129 days for PV System Installation and Testing; 21 days for Site Cleanup and Restoration. Source: CalEEMod Version 2020.4.0 (see Appendix A); CARB, 2017.

Table H shows that the on-road construction-related vehicle trips would consume 57,078 gallons of fuel and as detailed above, Table G shows that the off-road construction equipment would consume 84,890 gallons of fuel. This would result in the total consumption of 141,968 gallons of petroleum fuel from construction of the proposed project.

Table H – On-Road Vehicle Trips and Fuel Consumption from Construction of the Proposed Project

Vehicle Trip Types	Daily Trips	Trip Length (miles)	Total Miles per Day	Total Miles per Phase ¹	Fleet Average Miles per Gallon ²	Fuel Used (gallons)
Site Preparation						
Worker Trips	240	7.3	1,752	40,296	25.1	1,607
Vendor Truck Trips	6	8.9	53	1,228	7.7	159
PV System Installation	n and Testing					
Worker Trips	240	7.3	1,752	226,008	25.1	9,015
Vendor Truck Trips	300	8.9	2,670	344,430	7.7	44,683
Site Clean-up and Res	storation					
Worker Trips	240	7.3	1,752	36,792	25.1	1,468
Vendor Truck Trips	6	8.9	53	1,121	7.7	145
		Total Fuel U	sed from On-R	oad Construction	on Vehicles (gallons)	57,078

Notes:

Source: CalEEMod Version 2020.4.0; CARB, 2018.

Operations-Related Energy Use

The operation of the proposed project is anticipated to use energy in the forms of petroleum fuel and electricity and create electricity and the calculations for each source are described below. It should be noted that the project would not use any natural gas.

Operational Petroleum Fuel

The on-road operations-related vehicle trips fuel usage was calculated through use of the total annual vehicle miles traveled assumptions from the CalEEMod model run as detailed above in Section 8.1, which found that operation of the proposed project would generate 14,869 vehicle miles traveled per year. It should be noted that the CalEEMod model provides a worst-case analysis, since the proposed project would be operated on an unstaffed basis and be monitored remotely and employees would only be onsite up to four times per year to wash the panels as well as occasional maintenance activities. The calculated total operational miles were then divided by the Imperial County fleet average rate of 27.5 miles per gallon, which was calculated through use of the EMFAC2017 model and based on the year 2021. The EMFAC2017 model printouts are shown in Appendix B. Based on the above calculation methodology, operational vehicle trips generated from the proposed project would consume 541 gallons per year.

Operation of the proposed project would also consume diesel fuel from the operation of the backup generator. The company Generator Source provides a fuel consumption table for backup diesel generators⁵, that shows a 20 kW generator would consume 1.3 gallons per hour with a ¾ load. As detailed

¹ Based on: 23 days for Site Preparation; 129 days for PV System Installation and Testing; 21 days for Site Cleanup and Restoration.

² From EMFAC 2017 model (see Appendix B). Worker Trips based on entire fleet of gasoline vehicles and Vendor Trips based on only truck fleet of diesel vehicles.

⁵ Obtained from: https://www.generatorsource.com/Diesel_Fuel_Consumption.aspx

above in Section 8.1, the typical maintenance cycling of the proposed diesel generator is anticipated to run 26 hours per year. This would result in the consumption of 34 gallons of diesel per year.

Operational Electricity Use

The operations-related electricity usage was calculated in the CalEEMod model run that is detailed above in Section 8.1 that found the proposed PV solar panels will generate 97,333,333 kWh per year of electricity and operation of the project will use 1,946,667 kWh per year of electricity, which would result in the net generation of 95,386,667 kWh per year of electricity.

9.0 THRESHOLDS OF SIGNIFICANCE

9.1 Criteria Pollutants

The ICAPCD CEQA Handbook (ICAPCD 2017) provides significance thresholds to assist lead agencies in determining whether a project may create a significant air quality impact. The ICAPCD CEQA Handbook defines any projects that emit criteria pollutants below significance levels as a "Tier I project" and is considered by the ICAPCD to create a less than significant adverse impact on air quality. For Tier I projects, the proposed project is required to implement a set of feasible standard mitigation measures provide in the ICAPCD CEQA Handbook. Since these measures are required for all projects in the County, these measures are considered as regulatory requirements and have been provided above in Section 1.5 as Project Design Features. For projects that meet or exceed the thresholds of significance for the operational phases of a project are called a "Tier II project" and will be deemed to have a potentially significant adverse impact on air quality.

Operational Criteria Pollutant Thresholds

The ICAPCD CEQA Handbook details that all operational emissions of a project, including motor vehicle, area source and stationary or point sources shall be quantified and compared to the thresholds shown in Table I.

Table I – ICAPCD Criteria Pollutant Thresholds of Significance for Operations

Pollutant	Tier I	Tier II
NOx and ROG	Less than 137 pounds/day	137 pounds/day and greater
PM10 and Sox	Less than 150 pounds/day	150 pounds/day and greater
CO and PM2.5	Less than 550 pounds/day	550 pounds/day and greater

Source: IPACD CEQA Handbook, Table 1 (ICAPCD, 2017).

Construction Criteria Pollutant Thresholds

The ICAPCD CEQA Handbook also establishes thresholds of significance for criteria pollutant emissions created during construction of projects. Table J provides general guidelines for determining significance of impacts created during construction of the proposed project.

Table J – ICAPCD Criteria Pollutant Thresholds of Significance for Construction

Pollutant	Threshold
PM10	150 pounds/day
ROG	75 pounds/day
NOx	100 pounds/day
СО	550 pounds/day

Source: IPACD CEQA Handbook, Table 4 (ICAPCD, 2017).

9.2 Odor Impacts

The ICAPCD CEQA Handbook states that an odor impact would occur if the proposed project exceeds the standards provided in California Health and Safety Code Sections 41700 and 41705 and ICAPCD Rule 407 that prohibit emissions from any source whatsoever in quantities of air contaminants or other material, that cause injury, detriment, or annoyance to the public health or damage to property.

For projects that would introduce sensitive receptors to a project site, the ICAPCD CEQA Handbook provides screening level distances for potential odor sources. If a project is proposed within one mile of a wastewater treatment plant, sanitary landfill, composting station, feedlot, asphalt plant, painting and coating operation, or rendering plant, a potential odor problem may result. If a project with sensitive receptors is proposed that is located within a mile of one of the above land uses, the ICAPCD should be contacted in order to receive specific information regarding any odor complaints or other odor problems with the identified potential odor source.

9.3 Energy Conservation

The 2018 amendments and additions to the CEQA Checklist includes an Energy Section that analyzes the proposed project's energy consumption in order to avoid or reduce inefficient, wasteful or unnecessary consumption of energy. Since the Energy Section was recently added, no state or local agencies have adopted specific criteria or thresholds to be utilized in an energy impact analysis. However, the 2018 *Guidelines for the Implementation of the California Environmental Quality Act,* provide the following direction on how to analyze a project's energy consumption:

"If analysis of the project's energy use reveals that the project may result in significant environmental effects due to wasteful, inefficient, or unnecessary use of energy, or wasteful use of energy resources, the EIR shall mitigate that energy use. This analysis should include the project's energy use for all project phases and components, including transportation-related energy, during construction and operation. In addition to building code compliance, other relevant considerations may include, among others, the project's size, location, orientation, equipment use and any renewable energy features that could be incorporated into the project. (Guidance on information that may be included in such an analysis is presented in Appendix F.) This analysis is subject to the rule of reason and shall focus on energy use that is caused by the project. This analysis may be included in related analyses of air quality, greenhouse gas emissions, transportation or utilities in the discretion of the lead agency."

If the proposed project creates inefficient, wasteful or unnecessary consumption of energy during construction or operation activities or conflicts with a state or local plan for renewable energy or energy efficiency, then the proposed project would create a significant energy impact.

9.4 Greenhouse Gas Emissions

Neither the County of Imperial nor the ICAPCD has established significance thresholds for GHG emissions. In order to establish context in which to consider the GHG emissions created from the proposed project, this analysis reviewed guidelines used by other public agencies in California and found the most conservative GHG emissions threshold is detailed in CEQA & Climate Change, prepared by California Air Pollution Control Officers Association (CAPCOA 2008), which recommends a threshold of 900 MTCO₂e per year from any project. It should also be noted that a direct comparison of construction GHG emissions with long-term thresholds would not be appropriate, since construction emissions are short-term in nature and would cease upon completion of construction. Other Air Districts, including the SCAQMD, recommend that GHG emissions from construction activities be amortized over 30 years, when construction emissions are compared to operational-related GHG emissions thresholds.

The GHG emissions analysis for both construction and operation of the proposed project can be found below in Sections 10.8 and 10.9.

10.0 IMPACT ANALYSIS

10.1 CEQA Thresholds of Significance

Consistent with CEQA and the State CEQA Guidelines, a significant impact related to air quality, energy, and GHG emissions would occur if the proposed project is determined to:

- 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 in non-attainment under 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) adversely affecting a substantial number of people;
- Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation;
- Conflict with or obstruct a state or local plan for renewable energy;
- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.

10.2 Air Quality Compliance

The proposed project would not conflict with or obstruct implementation of the applicable air quality plans, which include the 2017 Ozone SIP, 2018 PM10 Plan, and 2018 PM2.5 SIP that are described above in the air quality regulatory setting. The ICAPCD CEQA Handbook (ICAPCD 2017), details that for any project that emits less than the screening thresholds provided above in Section 9.1 for construction and operations, the project is compliant with the most current ozone and PM10 attainment plans and no further demonstration of compliance with these plans is required.

The construction and operational air emissions have been calculated through use of the CalEEMod model and the input parameters utilized in this analysis have been detailed above in Section 7.1 and the CalEEMod model printouts are provided in Appendix A. Table K shows the maximum summer or winter daily emissions for each year of construction activities for the proposed project with implementation of the Project Design Features shown above in Section 1.5.

Table K – Construction-Related Criteria Pollutant Emissions

		Pollutant Emissions (pounds/day)				
Construction Year	ROG	NOx	СО	SO ₂	PM10	PM2.5
2021	6.11	51.82	39.73	0.08	67.20	12.54
2022	4.57	39.74	36.41	0.12	128.90	14.44
Maximum Daily Emissions	6.11	51.82	39.73	0.12	128.90	14.44
ICAPCD Thresholds	75	100	550		150	
Exceeds Threshold?	No	No	No		No	

Source: CalEEMod Version 2020.4.0.

Table K shows that construction activities for the proposed project will not exceed the ICAPCD thresholds of significance. Therefore, a less than significant air quality impact would occur from construction of the proposed project.

The calculated maximum daily emissions created from operation of the proposed project are shown in Table L.

Table L – Operational Criteria Pollutant Emissions

		Pollutant Emissions (pounds/day)				
Activity	ROG	NOx	СО	SO ₂	PM10	PM2.5
Area Sources ¹	5.35	0.00	0.04	0.00	0.00	0.00
Energy Usage ²	0.00	0.00	0.00	0.00	0.00	0.00
Mobile Sources ³	0.17	0.18	1.31	0.00	2.35	0.27
Backup Generator ⁴	0.05	0.17	0.18	0.00	0.01	0.01
Total Emissions	5.57	0.35	1.53	0.00	2.35	0.28
ICAPCD Operational Thresholds	137	137	550	150	150	550
Exceeds Threshold?	No	No	No	No	No	No

Notes:

The data provided in Table L shows that none of the analyzed criteria pollutants would exceed the ICAPCD thresholds of significance. Therefore, a less than significant air quality impact would occur from operation of the proposed project.

As shown above, both construction and operational emissions created from the proposed project would be within their respective ICAPCD thresholds. According to the ICAPCD Handbook, projects that are within the ICAPCD thresholds are consistent with the regional air quality plans. Furthermore, the standard mitigation measures provided in the ICAPCD Handbook have been incorporated into the proposed project as Project Design Features (see Section 1.5, above), and the proposed project will be required to implement all of the ICAPCD Regulation VIII, fugitive dust control measures during construction and operation of the proposed project. Furthermore, any stationary sources of emissions operated on site will be required to adhere to ICAPCD Rule 207, New and Modified Stationary Source Review and Rule 201 that require permits to construct and operate stationary sources. Therefore, the proposed project would not conflict with or obstruct implementation of the applicable air quality plans and impacts would be less than significant.

Level of Significance

Less than significant impact.

10.3 Cumulative Net Increase in Non-Attainment Pollution

The proposed project would not 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.

¹ Area sources consist of emissions from consumer products, architectural coatings, and landscaping equipment.

² Energy usage consist of emissions from natural gas usage (no natural gas usage during operation of the project).

³ Mobile sources consist of emissions from vehicles and road dust.

⁴ Backup Generator based on a 20 kW (62 Horsepower) diesel generator that has a cycling schedule of 30 minutes per week. Source: Calculated from CalEEMod Version 2020.4.0.

The ICAPCD CEQA Handbook provides project emissions limits that are provided above in Section 9.1 for both construction and operation of projects within the County. The ICAPCD Handbook details that if the air emissions created from a project are below the air emissions thresholds shown in Section 9.1, then the proposed project's air emissions would result in a less than significant impact, provided that all standard mitigation measures listed in the ICAPCD Handbook are implemented as well as all applicable ICAPCD rules controlling emissions are adhered to.

As shown above in Table J, construction activities for the proposed project will not exceed the ICAPCD thresholds of significance for construction. Also, as shown in Table I, daily operations of the proposed project will not exceed the ICAPCD thresholds of significance for operations.

The standard mitigation measures from the ICAPCD Handbook for both construction and operations have been incorporated into the proposed project as Project Design Features 1 through 7 (see Section 1.5, above). Furthermore, the proposed project would be required to implement all of the ICAPCD Regulation VIII, fugitive dust control measures during construction and operation of the proposed project. Furthermore, any stationary sources of emissions operated on site will be required to adhere to ICAPCD Rule 207, New and Modified Stationary Source Review and Rule 201 that require permits to construct and operate stationary sources. Therefore, the proposed project would result in a less than significant cumulatively considerable net increase of any criteria pollutant.

Friant Ranch Decision

In Sierra Club v. County of Fresno (2018) 6 Cal.5th 502 (also referred to as "Friant Ranch"), the California Supreme Court held that when an EIR concluded that when a project would have significant impacts to air quality impacts, an EIR should "make a reasonable effort to substantively connect a project's air quality impacts to likely health consequences." As shown in Table L above, and unlike the project at issue in the Friant Ranch case, the project's emissions of criteria pollutants would not exceed the ICAPCD's thresholds and would not have a significant air quality impact. Therefore, it is not necessary to connect this small project's air quality impacts to likely health impacts. However, for informational purposes this analysis considers the Court's direction as follows:

1) The air quality discussion shall describe the specific health risks created from each criteria pollutant, including diesel particulate matter.

Although it has been determined that the project would not result in significant air quality impacts, this analysis details the specific health risks created from each criteria pollutant above in Section 2.1 and specifically in Table B. In addition, the specific health risks created from diesel particulate matter is detailed above in Section 2.2 of this analysis. As such, this analysis meets the part 1 requirements of the Friant Ranch Case

2) The analysis shall identify the magnitude of the health risks created from the Project. The Ruling details how to identify the magnitude of the health risks. Specifically, on page 24 of the ruling it states "The Court of Appeal identified several ways in which the EIR could have framed the analysis so as to adequately inform the public and decision makers of possible adverse health effects. The County could have, for example, identified the Project's impact on the days of nonattainment per year."

The Friant Ranch Case found that an EIR's air quality analysis must meaningfully connect the identified air quality impacts to the human health consequences of those impacts, or meaningfully explain why that

analysis cannot be provided. As noted in the Brief of Amicus Curiae by the SCAQMD in the Friant Ranch case⁶ (Brief), SCAQMD has among the most sophisticated air quality modeling and health impact evaluation capability of any of the air districts in the State, and thus it is uniquely situated to express an opinion on how lead agencies should correlate air quality impacts with specific health outcomes. The SCAQMD discusses that it may be infeasible to quantify health risks caused by projects similar to the proposed Project, due to many factors. It is necessary to have data regarding the sources and types of air toxic contaminants, location of emission points, velocity of emissions, the meteorology and topography of the area, and the location of receptors (worker and residence). The Brief states that it may not be feasible to perform a health risk assessment for airborne toxics that will be emitted by a generic industrial building that was built on "speculation" (i.e., without knowing the future tenant(s)). Even where a health risk assessment can be prepared, however, the resulting maximum health risk value is only a calculation of risk, it does not necessarily mean anyone will contract cancer as a result of the Project. The Brief also cites the author of the CARB methodology, which reported that a PM2.5 methodology is not suited for small projects and may yield unreliable results. Similarly, SCAQMD staff does not currently know of a way to accurately quantify ozone-related health impacts caused by NOX or VOC emissions from relatively small projects, due to photochemistry and regional model limitations. The Brief concludes, with respect to the Friant Ranch EIR, that although it may have been technically possible to plug the data into a methodology, the results would not have been reliable or meaningful.

On the other hand, for extremely large regional projects (unlike the proposed project), the SCAQMD states that it has been able to correlate potential health outcomes for very large emissions sources – as part of their rulemaking activity, specifically 6,620 pounds per day of NOx and 89,180 pounds per day of VOC were expected to result in approximately 20 premature deaths per year and 89,947 school absences due to ozone.

As shown above in Table K, project-related construction activities would generate a maximum of 6.11 pounds per day of VOC and 51.82 pounds per day of NOx and as shown above in Table L, operation of the proposed project would generate 5.57 pounds per day of VOC and 0.35 pounds per day NOx. The proposed project would not generate anywhere near these levels of 6,620 pounds per day of NOx or 89,190 pounds per day of VOC emissions. Therefore, the proposed project's emissions are not sufficiently high enough to use a regional modeling program to correlate health effects on a basin-wide level.

Therefore, the proposed project would not result in a cumulatively considerable net increase of any criteria pollutant.

Level of Significance

Less than significant impact.

10.4 Sensitive Receptors

The proposed project would not expose sensitive receptors to substantial pollutant concentrations. The nearest sensitive receptors to the project site are single-family homes located as near as 40 feet to the north side of the project site (near the northwest corner of the project site). The nearest school is Brawley

6 Obtained from: https://www.courts.ca.gov/documents/9-s219783-ac-south-coast-air-quality-mgt-dist-041315.pdf

Union High School and Desert Valley High School, which is located as near as 2.7 miles south of the project site.

The IPACD CEQA Guidelines detail that any development project that is located within close proximity to sensitive receptors and where the proposed project either 1) Has the potential to emit toxic or hazardous pollutant; or 2) Exceeds the ICAPCD criteria pollutant thresholds for construction and operation of the proposed project. In addition, any proposed industrial or commercial project located within 1,000 feet of a school must be referred to the ICAPCD for review.

As detailed above in Section 10.2, the proposed project would not exceed the ICAPCD criteria pollutant threshold from either construction or operation of the proposed project. However, construction and operation of the proposed project would have the potential to emit TAC emissions, which have been analyzed separately below.

Toxic Air Contaminants Impacts from Construction

The greatest potential for toxic air contaminant emissions would be related to diesel particulate matter (DPM) emissions associated with heavy equipment operations during construction of the proposed project. According to CARB methodology, health effects from carcinogenic air toxics are usually described in terms of "individual cancer risk". "Individual Cancer Risk" is the likelihood that a person exposed to concentrations of toxic air contaminants over a 70-year lifetime will contract cancer, based on the use of standard risk-assessment methodology. It should be noted that the most current cancer risk assessment methodology recommends analyzing a 30-year exposure period for the nearby sensitive receptors (OEHHA 2015).

Given the relatively limited number of heavy-duty construction equipment, the varying distances that construction equipment would operate to the nearby sensitive receptors, and the short-term construction schedule, the proposed project would not result in a long-term (i.e., 30 or 70 years) substantial source of toxic air contaminant emissions and corresponding individual cancer risk. In addition, California Code of Regulations Title 13, Article 4.8, Chapter 9, Section 2449 regulates emissions from off-road diesel equipment in California. This regulation limits idling of equipment to no more than five minutes, requires equipment operators to label each piece of equipment and provide annual reports to CARB of their fleet's usage and emissions. This regulation also requires systematic upgrading of the emission Tier level of each fleet, and currently no commercial operator is allowed to purchase Tier 0 or Tier 1 equipment and by January 2023 no commercial operator is allowed to purchase Tier 2 equipment. In addition to the purchase restrictions, equipment operators need to meet fleet average emissions targets that become more stringent each year between years 2014 and 2023. By January, 2022, 50 percent or more of all contractors' equipment fleets must be Tier 2 or higher. Therefore, no significant short-term toxic air contaminant impacts would occur during construction of the proposed project. As such, construction of the proposed project would result in a less than significant exposure of sensitive receptors to substantial pollutant concentrations.

Operations-Related Sensitive Receptor Impacts

The proposed project would consist of development of a solar facility with a BESS and a substation. Although the proposed solar PV panels, the lithium batteries utilized in the BESS, and the transformers utilized in the substation are made with toxic materials, only a negligible amount of TAC emissions are emitted from off-gassing from the PV panels, which would not create TAC concentrations high enough to create a significant cancer risk from TAC emissions. In addition, the proposed project would include a

backup diesel generator, which would emit DPM emissions, which is categorized as a TAC. The backup diesel generator would be located in the southwest portion of the project site, where the nearest offsite sensitive receptor is a home on the east side of Best Avenue that located approximately 1,900 feet to the east. Due to the distance that the nearest sensitive receptor, a less than significant TAC impact would occur from the backup diesel generator. Therefore, a less than significant TAC impact would occur during the on-going operations of the proposed project and no mitigation would be required

Therefore, construction and operation of the proposed project would result in a less than significant exposure of sensitive receptors to substantial pollutant concentrations.

Level of Significance

Less than significant impact.

10.5 Odor Emissions

The proposed project would not create objectionable odors affecting a substantial number of people. Individual responses to odors are highly variable and can result in a variety of effects. Generally, the impact of an odor results from a variety of factors such as frequency, duration, offensiveness, location, and sensory perception. The frequency is a measure of how often an individual is exposed to an odor in the ambient environment. The intensity refers to an individual's or group's perception of the odor strength or concentration. The duration of an odor refers to the elapsed time over which an odor is experienced. The offensiveness of the odor is the subjective rating of the pleasantness or unpleasantness of an odor. The location accounts for the type of area in which a potentially affected person lives, works, or visits; the type of activity in which he or she is engaged; and the sensitivity of the impacted receptor.

Sensory perception has four major components: detectability, intensity, character, and hedonic tone. The detection (or threshold) of an odor is based on a panel of responses to the odor. There are two types of thresholds: the odor detection threshold and the recognition threshold. The detection threshold is the lowest concentration of an odor that will elicit a response in a percentage of the people that live and work in the immediate vicinity of the project site and is typically presented as the mean (or 50 percent of the population). The recognition threshold is the minimum concentration that is recognized as having a characteristic odor quality, this is typically represented by recognition by 50 percent of the population. The intensity refers to the perceived strength of the odor. The odor character is what the substance smells like. The hedonic tone is a judgment of the pleasantness or unpleasantness of the odor. The hedonic tone varies in subjective experience, frequency, odor character, odor intensity, and duration. Potential odor impacts have been analyzed separately for construction and operations below.

Construction-Related Odor Impacts

Potential sources that may emit odors during construction activities include the application of coatings such as asphalt pavement, paints and solvents and from emissions from diesel equipment. Standard construction requirements that limit the time of day when construction may occur as well as adherence to ICAPCD Rule 407 that limits the discharge of any emissions that create odors in quantities that would cause a nuisance or annoyance to any considerable number of persons. As such, the objectionable odors that may be produced during the construction process would be temporary and would not likely be noticeable for extended periods of time beyond the project site's boundaries. Through compliance with the applicable regulations that reduce odors and due to the transitory nature of construction odors, a less than significant odor impact would occur and no mitigation would be required.

Operations-Related Odor Impacts

The proposed project would consist of the development of solar energy facility, which does not include any components that are a known sources of odors. Therefore, a less than significant odor impact would occur and no mitigation would be required.

Level of Significance

Less than significant impact.

10.6 Energy Consumption

The proposed project would impact energy resources during construction and operation. Energy resources that would be potentially impacted include electricity, and petroleum based fuel supplies and distribution systems. The proposed project would not utilize any natural gas during either construction or operation of the proposed project, and no further analysis of natural gas is provided in this analysis. This analysis includes a discussion of the potential energy impacts of the proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy. A general definition of each of these energy resources are provided below.

Electricity, a consumptive utility, is a man-made resource. The production of electricity requires the consumption or conversion of energy resources, including water, wind, oil, gas, coal, solar, geothermal, and nuclear resources, into energy. The delivery of electricity involves a number of system components, including substations and transformers that lower transmission line power (voltage) to a level appropriate for on-site distribution and use. The electricity generated is distributed through a network of transmission and distribution lines commonly called a power grid. Conveyance of electricity through transmission lines is typically responsive to market demands. In 2019, Imperial Irrigation District, which provides electricity to the project vicinity provided 3,322 Gigawatt-hours per year of electricity⁷.

Petroleum-based fuels currently account for a majority of the California's transportation energy sources and primarily consist of diesel and gasoline types of fuels. However, the state has been working on developing strategies to reduce petroleum use. Over the last decade California has implemented several policies, rules, and regulations to improve vehicle efficiency, increase the development and use of alternative fuels, reduce air pollutants and GHG emissions from the transportation sector, and reduce vehicle miles traveled (VMT). Accordingly, petroleum-based fuel consumption in California has declined. In 2017, 83 million gallons of gasoline and 12 million gallons of diesel was sold in Imperial County⁸.

The following section calculates the potential energy consumption associated with the construction and operations of the proposed project and provides a determination if any energy utilized by the proposed project is wasteful, inefficient, or unnecessary consumption of energy resources.

Construction Energy

The construction activities for the proposed project are anticipated to include: 1) Site Preparation; 2) PV System Installation and Testing, and 3) Site Clean-up and Restoration. The proposed project would consume energy resources during construction in three (3) general forms:

⁷ Obtained from: http://www.ecdms.energy.ca.gov/elecbyutil.aspx

⁸ Obtained from: https://ww2.energy.ca.gov/almanac/transportation_data/gasoline/

- 1. Petroleum-based fuels used to power off-road construction vehicles and equipment on the project site, construction worker travel to and from the project site, as well as delivery and haul truck trips (e.g., hauling of construction waste material to off-site reuse and disposal facilities);
- Electricity associated with the conveyance of water that would be used during project construction for dust control (supply and conveyance) and electricity to power any necessary lighting during construction, electronic equipment, or other construction activities necessitating electrical power; and,
- 3. Energy used in the production of construction materials, such as asphalt, steel, concrete, pipes, and manufactured or processed materials such as lumber and glass.

Construction-Related Electricity

During construction the proposed project would consume electricity to construct the new structures and infrastructure. Electricity would be supplied to the project site by Imperial Irrigation District (IID) and would be obtained from the existing electrical lines in the vicinity of the project site. The use of electricity from existing power lines rather than temporary diesel or gasoline powered generators would minimize impacts on energy use. Electricity consumed during project construction would vary throughout the construction period based on the construction activities being performed. Various construction activities include electricity associated with the conveyance of water that would be used during project construction for dust control (supply and conveyance) and electricity to power any necessary lighting during construction, electronic equipment, or other construction activities necessitating electrical power. Such electricity demand would be temporary, nominal, and would cease upon the completion of construction. Overall, construction activities associated with the proposed project would require limited electricity consumption that would not be expected to have an adverse impact on available electricity supplies and infrastructure. Therefore, the use of electricity during project construction would not be wasteful, inefficient, or unnecessary.

The proposed project would include installation of an approximately 1.6 mile long overhead power lines from the southwest corner of the project site to the North Brawley 1 Substation, which would provide adequate capacity to handle the power generated and utilized by the proposed project. Where feasible, the new service installations and connections would be scheduled and implemented in a manner that would not result in electrical service interruptions to other properties. Compliance with County guidelines and requirements would ensure that the proposed project fulfills its responsibilities relative to infrastructure installation, coordinates any electrical infrastructure removals or relocations, and limits any impacts associated with construction of the project. Construction of the project's electrical infrastructure is not anticipated to adversely affect the electrical infrastructure serving the surrounding uses or utility system capacity.

Construction-Related Petroleum Fuel Use

Petroleum-based fuel usage represents the highest amount of transportation energy potentially consumed during construction, which would be utilized by both off-road equipment operating on the project site and on-road automobiles transporting workers to and from the project site and on-road trucks transporting equipment and supplies to the project site.

The off-road construction equipment fuel usage was calculated through use of the off-road equipment assumptions and fuel use assumptions shown above in Section 8.2, which found that the off-road equipment utilized during construction of the proposed project would consume 84,890 gallons of fuel.

The on-road construction trips fuel usage was calculated through use of the construction vehicle trip assumptions and fuel use assumptions shown above in Section 8.2, which found that the on-road trips generated from construction of the proposed project would consume 57,078 gallons of fuel. As such, the combined fuel used from off-road construction equipment and on-road construction trips for the proposed project would result in the consumption of 141,968 gallons of petroleum fuel. This equates to 0.15 percent of the gasoline and diesel consumed annually in Imperial County. As such, the construction-related petroleum use would be nominal, when compared to current county-wide petroleum usage rates.

Construction activities associated with the proposed project would be required to adhere to all State and SCAQMD regulations for off-road equipment and on-road trucks, which provide minimum fuel efficiency standards. As such, construction activities for the proposed project would not result in the wasteful, inefficient, and unnecessary consumption of energy resources. Impacts regarding transportation energy would be less than significant. Development of the project would not result in the need to manufacture construction materials or create new building material facilities specifically to supply the proposed project. It is difficult to measure the energy used in the production of construction materials such as asphalt, steel, and concrete, it is reasonable to assume that the production of building materials such as concrete, steel, etc., would employ all reasonable energy conservation practices in the interest of minimizing the cost of doing business.

Operational Energy

The on-going operation of the proposed project would require the use of energy resources for multiple purposes including, but not limited to, heating/ventilating/air conditioning (HVAC), lighting, and electronics. Energy would also be consumed during operations related to water usage and vehicle trips.

Operations-Related Electricity

Operation of the proposed project would result in consumption and production of electricity at the project site. As detailed above in Section 8.2 the proposed PV solar panels will generate 97,333,333 kWh per year of electricity and operation of the project will use 1,946,667 kWh per year of electricity, which would result in the net generation of 95,386,667 kWh per year of electricity. This equates to 2.8 percent of the electricity consumed annually by IID. As such, the operations-related electricity use would provide a significant renewable resource for the IID and would help IID achieve the State' Renewable Portfolio Standards requirement for non-carbon sources of electricity. No impact would occur from electricity-related energy consumption from the proposed project.

Operations-Related Vehicular Petroleum Fuel Usage

Operation of the proposed project would result in increased consumption of petroleum-based fuels related to vehicular travel to and from the project site. As detailed above in Section 8.2 the proposed project would consume 541 gallons of petroleum fuel per year from vehicle travel. This equates to 0.001 percent of the gasoline and diesel consumed in Imperial County annually. As such, the operations-related petroleum use would be nominal, when compared to current petroleum usage rates

It should be noted that, the proposed project would comply with all Federal, State, and County requirements related to the consumption of transportation energy and would provide a non-carbon source of electricity to power electric vehicles in Imperial County. Thus, impacts with regard transportation energy supply and infrastructure capacity would be less than significant and no mitigation measures would be required.

In conclusion, the proposed project would comply with regulatory compliance measures outlined by the State and County related to Air Quality, Greenhouse Gas Emissions (GHG), Transportation/Circulation, and Water Supply. Therefore, the proposed project would not result in the wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation. Impacts would be less than significant.

Level of Significance

Less than significant impact.

10.7 Energy Plan Consistency

The proposed project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. The applicable energy plan for the proposed project is the *Renewable Energy and Transmission Element County of Imperial General Plan*, Revised October 6, 2015. The proposed project's consistency with the applicable energy-related policies in the Natural Resource Element of the General Plan are shown in Table M.

Table M - Proposed Project Compliance with Applicable General Plan Energy Policies

Goals,		
Objectives		
and Policies		Proposed Project Implementation Actions
Goal 1	Support the safe and orderly development of renewable energy while providing for the protection of environmental resources.	Consistent. The proposed project provides protection to environmental resources while helping to produce renewable energy.
Objective	The County of Imperial supports the overall goals of	Not Applicable. This objective is related to the
1.1	the Desert Renewable Energy Conservation Plan to provide a balance between the developments of renewable energy resources while preserving sensitive environmental resources within its jurisdiction.	County requirements.
Objective 1.2	Lessen impacts of site and design production facilities on agricultural, natural, and cultural resources.	Consistent. The proposed project impacts related to these subjects have been evaluated in the DEIR prepared for this project.
Objective 1.3	Require the use of directional geothermal drilling and "islands" when technically advisable in irrigated agricultural soils and sensitive or unique biological areas.	Not applicable. The proposed project would not include any geothermal drilling
Objective 1.4	Analyze potential impacts on agricultural, natural, and cultural resources, as appropriate.	Consistent. This DEIR prepared for this project has analyzed the potential impacts related to these subjects.
Objective 1.5	Require appropriate mitigation and monitoring for environmental issues associated with developing renewable energy facilities.	Consistent. The proposed Project provides a mitigation monitoring program.
Objective 1.6	Encourage the efficient use of water resources required in the operation of renewable energy generation facilities.	Consistent. The proposed Project will be designed to meet Title 24 Part 11 requirements that require implementation of water-efficiency measures.
Objective 1.7	Assure that development of renewable energy facilities and transmission lines comply with	Consistent. The proposed Project will be required to obtain all required air permits from

Goals, Objectives and Policies	General Plan	Proposed Project Implementation Actions
	Imperial County Air Pollution Control District's regulations and mitigation measures.	the ICAPCD and to adhere to all of the ICAPCD rules and regulations.
Goal 2	Encourage development of electrical transmission lines along routes which minimize potential environmental effects.	Consistent. Any required improvements or extensions of existing IID electrical transmission lines will occur adjacent to existing routes.
Objective 2.1	To the extent practicable, maximize utilization of IID's transmission capacity in existing easements or rights-of-way. Encourage the location of all major transmission lines within designated corridors, easements, and rights-of-way.	Consistent. Any required improvements or extensions of IID electrical transmission lines will occur within existing easements or right-of-ways.
Objective 2.2	Where practicable and cost-effective, design transmission lines to minimize impacts on agricultural, natural, and cultural resources, urban areas, military operation areas, and recreational activities.	Consistent. Any required improvements or extensions of IID electrical transmission lines will occur within existing easements or right-ofways.
Goal 3	Support development of renewable energy resources that will contribute to and enhance the economic vitality of Imperial County.	Consistent. The proposed project will provide additional employment opportunities as well as contribute to the tax base of the County, that will enhance the economic vitality of the County.
Objective 3.1	Preserve IID's Balancing Authority and local rate- making authority which allows IID to continue to provide low-cost service. Lower energy rates enhance the economic vitality in Imperial County.	Not Applicable. This measure applies to the IID.
Objective 3.2	Encourage the continued development of the mineral extraction/production industry for job development using geothermal brines from the existing and future geothermal flash power plants.	Not applicable. The proposed project would not include any geothermal activities.
Objective 3.3	Encourage the development of services and industries associated with renewable energy facilities.	Consistent. The proposed project implements this Objective.
Objective 3.4	Assure that revenues projected from proposed renewable energy facility developments are sufficient to offset operational costs to the County from that particular development.	Consistent. The proposed project would generate more revenue for the County than any costs incurred by the County.
Objective 3.5	Encourage employment of County residents by the renewable energy industries wherever and whenever possible.	Consistent. The proposed project will provide additional employment opportunities to residents in the County.
Objective 3.6	Encourage the establishment of necessary and applicable renewable energy training programs in local school systems in association with the renewable energy industry.	Not Applicable. This measure applies to the local school systems.
Objective 3.7	Evaluate environmental justice issues associated with job creation and displacement when considering the approval of renewable energy projects.	Consistent. No impacts to disadvantaged communities would occur from implementation of the proposed Project.

Goals, Objectives and Policies	General Plan	Proposed Project Implementation Actions
Goal 4	Support development of renewable energy	Not applicable. The proposed project is not
	resources that will contribute to the restoration efforts of the Salton Sea.	located within the Salton Sea restoration area.
Objective 4.1	Prioritize the Salton Sea exposed seabed (playa) for renewable energy	Not applicable. The location of the project was chosen to be in close proximity to the existing North Brawley Geothermal Power Plant Substation.
Objective 4.2	Encourage the development of renewable energy facilities that will contribute to the reduction or elimination of airborne pollutants created by exposure of the seabed of the Salton Sea as it recedes.	Not applicable. The proposed project is not located within the Salton Sea restoration area.
Objective 4.3	Develop mitigation measures and monitoring programs to minimize impacts to avian species and other species that may be affected by renewable energy facilities constructed near the Salton Sea.	Not applicable. The proposed project is not located near the Salton Sea.
Goal 5	Encourage development of innovative renewable energy technologies that will diversify Imperial County's energy portfolio.	Consistent. The proposed project will utilize the innovative renewable technologies in its design.
Objective 5.1	Support the implementation of pilot projects intended to test or demonstrate new and innovative renewable energy production technologies.	Consistent. Although the proposed project is for full production and not a pilot project, it will demonstrate new and innovative renewable energy production technologies.
Objective 5.2	Encourage development of utility-scale distributed generation projects in the County.	Consistent. The proposed project consists of a utility-scale solar PV system with a BESS.
Goal 6	Support development of renewable energy while providing for the protection of military aviation and operations.	Consistent. The proposed project will be designed to meet all aviation requirements.
Objective 6.1	Assure that renewable energy facilities proposed in areas adjacent to military installations and training areas will be compatible with these uses.	Not Applicable. No military facilities exist in the local vicinity to the project site.
Objective 6.2	Facilitate the early exchange of project-related information with the military for proposed renewable energy facilities located within a military operations area (MOA) or within 1,000 feet of a military installation.	Not Applicable. No military facilities exist within 1,000 feet of the project site.
Objective 6.3	Assure that renewable energy facilities proposed within MOAs will not jeopardize the safety of existing residents or impact military operations.	Not Applicable. No military facilities exist in the local vicinity to the project site.
Goal 7	Actively minimize the potential for land subsidence to occur as a result of renewable energy operations.	Consistent. The proposed project will be designed to minimize land subsidence.
Objective 7.1	Require that all renewable energy facilities, where deemed appropriate, include design features that will prevent subsidence and other surface conditions from impacting existing land uses.	Consistent. The proposed project will be designed to minimize land subsidence.
Objective 7.2	For geothermal energy development facilities, establish injection standards consistent with the requirements of the California Division of Oil, Gas,	Not applicable. The proposed project would not include any geothermal energy development.

Goals, Objectives	One 121	Duran d Durington I and
and Policies	General Plan and Geothermal Resources (CDOGGR). Request a	Proposed Project Implementation Actions
	CDOGGR subsidence review, if necessary, for consideration prior to setting injection standards.	
Objective 7.3	Require renewable energy facility permittees to establish and monitor subsidence detection networks in areas affected by permitted project activities.	Not applicable. The proposed project would not include any geothermal energy development
Objective 7.4	Require monitoring programs for determining the possibility or extent of induced subsidence.	Not applicable. The proposed project would not include any geothermal energy development
Objective 7.5	Require corrective measures, in proportion to each developer's activities, if evidence indicates that operation of geothermal energy facilities have caused, or will cause, surface impacts. In determining monitoring or mitigation requirements, the County shall consult with informed parties such as CDOGGR, County Department of Public Works, the IID, the permittee, other developers, and other experts as appropriate.	Not applicable. The proposed project would not include any geothermal energy development
Objective 7.6	Where geothermal fields have been divided into units or developers have established a cooperative agreement for reservoir management, specific production and injection requirements of individually permitted projects may be modified in accordance with both Federal and State requirements.	Not applicable. The proposed project would not include any geothermal energy development
Objective 7.7	Require seismic monitoring be performed in conjunction with major geothermal projects.	Not applicable. The proposed project would not include any geothermal energy development
Objective 7.8	Require operators of geothermal facilities analyze seismic data to determine the effects of geothermal production and injection on seismic activities within the development area.	
Objective 7.9	Consult with experts, such as CDOGGR, U.S. Geological Survey, geothermal industry representatives, permittees, and other developers to determine appropriate monitoring and mitigation requirements.	Not applicable. The proposed project would not include any geothermal energy development
Objective 7.10	Require operators of geothermal facilities to establish a notification system to warn or notify surrounding residents of the accidental release of potentially harmful emissions as part of an emergency response plan.	Not applicable. The proposed project would not include any geothermal energy development
Objective 7.11	Require all geothermal energy facilities to include operating procedures that would prevent detrimental impacts to geothermal reservoirs.	Not applicable. The proposed project would not include any geothermal energy development
Goal 8	Develop overlay zones that will facilitate the development of renewable energy resources while	Not Applicable. This measure is applicable to the County Planning Department.

Goals, Objectives and Policies	General Plan	Proposed Project Implementation Actions
	preserving and protecting agricultural, natural, and cultural resources. Development of overlay zones shall include coordination with Federal, State, County, Tribal governments, educational entities, the public and local industries.	
Objective 8.1	Allow for County review with appropriate development and performance standards for development of local resources within the overlay zones.	Not Applicable. This measure is applicable to the County Planning Department.
Objective 8.2	Promote the exchange of information concerning renewable energy development to be circulated between industry, County staff, and the public.	Not Applicable. This measure is applicable to the County Planning Department.

Source: County of Imperial, 2015.

As shown in Table M, the proposed project would be consistent with all applicable energy-related policies from the General Plan. Therefore, the proposed project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. Impacts would be less than significant.

Level of Significance

Less than significant impact.

10.8 Generation of Greenhouse Gas Emissions

The proposed project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment and would not conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing GHG emissions. Neither the County of Imperial nor the ICAPCD has established significance thresholds for GHG emissions. In order to establish context in which to consider the GHG emissions created from the proposed project, this analysis reviewed guidelines used by other public agencies in California and found the most conservative GHG emissions threshold is detailed in CEQA & Climate Change, prepared by California Air Pollution Control Officers Association (CAPCOA 2008), which recommends a threshold of 900 MTCO₂e per year from any project. It should also be noted that a direct comparison of construction GHG emissions with long-term thresholds would not be appropriate, since construction emissions are short-term in nature and would cease upon completion of construction. Other Air Districts, including the SCAQMD, recommend that GHG emissions from construction activities be amortized over 30 years, when construction emissions are compared to operational-related GHG emissions thresholds.

The proposed project is anticipated to generate GHG emissions from area sources, energy usage and production, mobile sources, waste disposal, water usage, and construction equipment. The project's GHG emissions have been calculated with the CalEEMod model based on the construction and operational parameters detailed above in Section 8.1. A summary of the results is shown below in Table N and the CalEEMod model run is provided in Appendix C.

Table N - Project Related Greenhouse Gas Annual Emissions

	Greenhou	se Gas Emissions (Metric Tons per	Year)
Category	CO ₂	CH ₄	N ₂ O	CO₂e
Area Sources ¹	0.01	0.00	0.00	0.01
Energy Usage and Production ²	-4,299.50	-0.75	-0.09	-4,345.14
Mobile Sources ³	5.35	0.00	0.00	5.44
Backup Generator⁴	0.61	0.00	0.00	0.62
Solid Waste ⁵	0.00	0.00	0.00	0.00
Water and Wastewater ⁶	0.38	0.01	0.00	0.66
Construction ⁷	18.63	0.00	0.00	18.88
Total GHG Emissions	-4,274.52	-0.73	-0.09	-4,319.54
GHG Emissions Threshold of Significance ⁸				900
Exceed Thresholds?				No

Notes:

Source: CalEEMod Version 2020.4.0.

The data provided in Table N shows that the proposed project would reduce GHG emissions created in Imperial County by 4,319.54 MTCO₂e per year by providing a zero carbon source of electricity generation. The proposed project would not exceed the annual GHG emissions threshold of 900 MTCO₂e per year. Therefore, no greenhouse gas emissions impact would occur from construction and operation of the proposed project.

Level of Significance

No impact.

10.9 Greenhouse Gas Plan Consistency

The proposed project would not conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing GHG emissions. Neither the County of Imperial nor the ICAPCD has adopted a climate action plan to reduce GHG emissions in the proposed project area. As such, the only applicable plans for reducing GHG emissions for the proposed project area are statewide plans that include AB 32, AB 197, and SB 32. As shown above in Section 10.8, the proposed project would reduce GHG emissions created in Imperial County by 4,319.54 MTCO₂e per year and would assist the County in meeting the zero carbon sources of electricity generation as required by the State's Renewable Portfolio Standards.

Therefore, the proposed project would not conflict with any applicable plan, policy, or regulation adopted for reducing the emissions of GHGs. No impact would occur.

Level of Significance

No impact.

¹ Area sources consist of GHG emissions from consumer products, architectural coatings, and landscaping equipment.

 $^{^{\}rm 2}$ Energy usage consists of GHG emissions from electricity used and generated onsite.

³ Mobile sources consist of GHG emissions from vehicles.

⁴ Backup Generator based on a 20 kW (62 Horsepower) diesel generator that has a cycling schedule of 30 minutes per week.

⁵ Solid Waste. Since no employees would be onsite during typical operations, no solid waste is anticipated to be generated from the project.

⁶ Water includes GHG emissions from electricity used for transport of water and processing of wastewater.

⁷ Construction emissions amortized over 30 years as recommended in the SCAQMD GHG Working Group on November 19, 2009.

⁸ GHG emissions threshold from CAPCOA, 2008.

11.0 REFERENCES

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APPENDIX A

CalEEMod Model Daily Printouts

CalEEMod Version: CalEEMod.2020.4.0

Brawley Solar Energy Facility - Imperial County, Summer

Date: 11/23/2021 11:32 AM

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Brawley Solar Energy Facility

Imperial County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Manufacturing	52.27		1.20		0
Refrigerated Warehouse-No Rail	100.80	1000sqft	ı	:	0
Other Non-Asphalt Surfaces	9.70	Acre	9.70	422,532.00	0
Other Non-Asphalt Surfaces	223.49	Acre	223.49	223.49 9,735,224.40	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	3.4	Precipitation Freq (Days)	12
Climate Zone	15			Operational Year	2022
Utility Company	Imperial Irrigation District				
CO2 Intensity (Ib/MWhr)	189.98	CH4 Intensity (Ib/MWhr)	0.033	N2O Intensity (Ib/MWhr)	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Total Project Site = 227 acres. Total Offsite Power Lines = 9.7 acres

Construction Phase - Construction schedule provided by applicant

Off-road Equipment - PV System Installation: 2 Aerial Lifts, 1 Air Compressor, 2 Cranes, 3 Forklifts, 1 Generator Set, 1 Grader, 2 Off-Hwy Trucks, 3 Tractors-Loaders-Backhoes, 1 Welder Off-road Equipment - PV System Install: 2 Aerial Lifts, Air Compressor, 2 Cranes, 3 Forklifts, 1 Generator Set, 1 Grader, 2 Off-Hwy Trucks, 3 Tractors-Loaders-Backhoes, 1 Welder

Off-road Equipment - Site Cleanup: 2 Graders, 2 Rubber Tired Loaders, 2 Rubber Tired Dozers, and 2 Tractors-Loaders-Backhoes

Off-road Equipment - Site Preparation: 2 Bore-Drill Rigs, 2 Excavators, 3 Rubber Tired Dozers, and 4 Tractor-Loader-Backhoe

Trips and VMT - 6 vendor trips per day added to Site Prep and Site Cleanup to account for water truck emissions. All worker trips set to 240 per day

Brawley Solar Energy Facility - Imperial County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

On-road Fugitive Dust - 85% of trips on pavement. Per Rule ICAPCD Rule 805 F.1.c - Material Silt Content set to 3%

Grading - Total Acres Graded 227 acres (Site Preparation Phase)

Vehicle Trips - 40 daily trips on Saturdays.

Road Dust - 99% roads paved

Consumer Products - Consumer products set to zero, since no workers will typical be onsite

Energy Use - No natural gas will be used onsite. Electricity use set to 1,946,667 per year.

Water And Wastewater - The project will use 0.81 acre feet or 263,939 gallons per year.

Solid Waste - Operation of the project will not generate solid waste

Construction Off-road Equipment Mitigation - Water Exposed Area 2x per day selected to account for ICAPCD Rule 801. Unpaved Road Moisture Content 7% selected to account for ICAPCD Rule 805 F.1.d. Unpaved Road vehicle speed set to 15 mph per PDF 3.

Energy Mitigation - Solar panels will generate 51,840,000 kWh-year

Stationary Sources - Emergency Generators and Fire Pumps - Emergency diesel generator - 62 hp, 0.73 load factor, 0.5 hour per day 26 hour per year

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	2
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	4,650.00	21.00
tblConstructionPhase	NumDays	465.00	129.00
tblConstructionPhase	NumDays	180.00	23.00
tblConsumerProducts	ROG_EF	2.14E-05	0
tblEnergyUse	LightingElect	2.93	0.00
tblEnergyUse	LightingElect	2.37	0.00
tblEnergyUse	NT24E	5.02	0.00
tblEnergyUse	NT24E	36.52	0.00
tblEnergyUse	NT24NG	17.13	0.00
tblEnergyUse	NT24NG	48.51	0.00
tblEnergyUse	T24E	1.97	0.00
tblEnergyUse	T24E	0.95	19.31
tblEnergyUse	T24NG	15.20	0.00
tblEnergyUse	T24NG	3.22	0.00

Brawley Solar Energy Facility - Imperial County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	227.00	2.00	2.00	2.00	8.00	3.00	3.00	3.00	85.00	85.00	85.00	85.00	85.00	85.00	66	00:00	00:00	6.00	6.00	300.00	240.00	240.00	240.00	00:00	0.40	00:00	00:00	00:00	0.00
	34.50	1.00	1.00	1.00	7.00	8.50	8.50	8.50	50.00	50.00	50.00	50.00	50.00	50.00	50	64.81	94.75	0.00	0.00	1,690.00	28.00	20.00	4,331.00	6.42	2.12	5.09	2.12	3.93	2.12
	AcresOfGrading	OffRoadEquipmentUnitAmount	OffRoadEquipmentUnitAmount	OffRoadEquipmentUnitAmount	UsageHours	MaterialSiltContent	MaterialSiltContent	MaterialSiltContent	VendorPercentPave	VendorPercentPave	VendorPercentPave	WorkerPercentPave	WorkerPercentPave	WorkerPercentPave	RoadPercentPave	SolidWasteGenerationRate	SolidWasteGenerationRate	VendorTripNumber	VendorTripNumber	VendorTripNumber	WorkerTripNumber	WorkerTripNumber	WorkerTripNumber	ST_TR	ST_TR	SU_TR	SU_TR	WD_TR	WD_TR
	tblGrading	tblOffRoadEquipment	tblOffRoadEquipment	tblOffRoadEquipment	tblOffRoadEquipment	tblOnRoadDust	tblOnRoadDust	tblOnRoadDust	tblOnRoadDust	tblOnRoadDust	tblOnRoadDust	tblOnRoadDust	tblOnRoadDust	tblOnRoadDust	tblRoadDust	tblSolidWaste	tblSolidWaste	tblTripsAndVMT	tblTripsAndVMT	tblTripsAndVMT	tblTripsAndVMT	tblTripsAndVMT	tblTripsAndVMT	tblVehicleTrips	tblVehicleTrips	tbIVehicleTrips	tbIVehicleTrips	tbIVehicleTrips	tblVehicleTrips

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Brawley Solar Energy Facility - Imperial County, Summer

EMFAC Off-Model Adju	odel Adjustment Factors for Gas	soline Light Duty Vehicle to Acc	stment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied
Water	_ ⊆	12,087,437.50	00.0
tblWater	. ⊻ ∣	doorWaterUseRate 23,310,000.00	263,939.00

2.0 Emissions Summary

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Brawley Solar Energy Facility - Imperial County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	XON	00	S02	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Bio- CO2 NBio- CO2 Total CO2	CH4	N2O	CO2e
Year					lb/day	day							lb/day	ay		
2021	6.1144	6.1144 51.7576 39.7322 0.0820 170.317	39.7322	0.0820	170.3175	2.4518 172.7693 25.3583 2.2559 27.6142	172.7693	25.3583	2.2559		0.000.0	8,016.337 9	0.0000 8,016.337 8,016.337 2.1660 0.0702 8,091.410 5	2.1660	0.0702	8,091.410
2022	4.5657	4.5657 38.2859 36.4080 0.1247 347.7005	36.4080	0.1247	347.7005	1.5639 349.0465 35.1849 1.4389	349.0465	35.1849		36.4563	0.0000	12,667.90 79	0.0000 12,667.90 12,667.90 1.5904 79 79	1.5904	1.0848 13,017.13 50	13,017.13 50
Maximum	6.1144	6.1144 51.7576 39.7322 0.1247 347.7005	39.7322	0.1247			2.4518 349.0465 35.1849 2.2559	35.1849		36.4563	0.0000	12,667.90 79	0.0000 12,667.90 12,667.90 2.1660 79	2.1660	1.0848 13,017.13 50	13,017.13 50

Mitigated Construction

CO2e		8,091.410 5	13,017.13 50	13,017.13 50	
N20		0.0702	1.0848 13,017.13 50	1.0848	
СН4	ay	2.1660	1.5904	2.1660	
Total CO2	lb/day	8,016.337 9	12,667.90 79	12,667.90 79	
Bio- CO2 NBio- CO2 Total CO2		8,016.337 9	0.0000 12,667.90 12,667.90 1.5904 79 79	0.0000 12,667.90 12,667.90 79 79	
Bio- CO2		0.0000	0.0000	0.000.0	
PM2.5 Total		12.5428 0.0000 8,016.337 8,016.337 2.1660 0.0702 8,091.410	14.4420	14.4420	
Exhaust PM2.5		2.2559	1.4389	2.2559	
Fugitive PM2.5	Fugitive PM2.5	10.2869 2.2559	13.1706	13.1706	
PM10 Total		67.1969	1.5639 128.9035 13.1706 1.4389	128.9035 13.1706	
Exhaust PM10	b/day	2.4518	1.5639	2.4518	
Fugitive PM10	o/qı	64.7451	127.5575	127.5575	
S02		0.0820	0.1247	0.1247	
00		39.7322	36.4080	39.7322	
NOX		6.1144 51.7576 39.7322 0.0820 64.7451	4.5657 38.2859 36.4080 0.1247 127.5575	6.1144 51.7576 39.7322 0.1247 127.5575	
ROG		6.1144	4.5657	6.1144	
	Year	2021	2022	Maximum	

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Brawley Solar Energy Facility - Imperial County, Summer

1		
9	C02e	0.00
Applie	N20	00'0
icle Ruk	СН4	0.00
\FE Veh	Total CO2	00.00
ctors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied	PM2.5 Bio- CO2 NBio-CO2 Total CO2	00.0
ccount fo	Bio- CO2	0.00
cle to A	PM2.5 Total	57.88
uty Vehi	Exhaust PM2.5	00'0
Light D	Fugitive PM2.5	61.26
Gasoline	PM10 Total	62.42
tors for (Exhaust PM10	00'0
nent Fac	Fugitive PM10	62.88
EMFAC Off-Model Adjustment Fac	SO2	00'0
f-Model	00	00'0
MFAC OI	XON	00'0
Ξ	ROG	0.00
		Percent Reduction

2.2 Overall Operational

Unmitigated Operational

CO2e		0.0901	0.0000	247.8760	26.1162	274.0823
N20			0.0000	0.0118		0.0118
CH4	lay	2.2000e- 004	0.000.0	0.0125	3.6500e- 003	0.0164
Total CO2	lb/day	0.0845	0.0000	244.0356	26.0249	270.1451 270.1451
Bio- CO2 NBio- CO2 Total CO2		0.0845	0.0000	244.0356	26.0249	270.1451
Bio- CO2						
PM2.5 Total		1.4000e- 004	0.0000	0.2718	7.4800e- 003	0.2794
Exhaust PM2.5		1.4000e- 004	0.0000	1.8000e- 003	7.4800e- 003	9.4200e- 003
Fugitive PM2.5				0.2700		0.2700
PM10 Total		1.4000e- 004	0.0000	2.3478	7.4800e- 003	2.3554
Exhaust PM10	lb/day	1.4000e- 1.4000e- 004 004	0.0000	1.9200e- 003	7.4800e- 003	9.5400e- 003
Fugitive PM10	/qI			2.3458		2.3458
SO2		0.0000	0.0000	2.3900e- 003	2.4000e- 004	2.6300e- 003
00		0.0395 0.0000	0.0000	1.3072	0.1846	1.5313
NOX		3.6000e- 004	0.0000	0.1653	0.1659	0.3316
ROG		5.3456	0.0000	0.1733	0.0509	5.5698
	Category	Area	Energy	Mobile	Stationary	Total

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Brawley Solar Energy Facility - Imperial County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Mitigated Operational

CO2e		0.0901	0.0000	247.8760	26.1162	274.0823
N20			0.000.0	0.0118		0.0118
CH4	À	2.2000e- 004	0.000.0	0.0125	3.6500e- 003	0.0164
Total CO2	lb/day	0.0845	0.0000	244.0356	26.0249	270.1451
Bio- CO2 NBio- CO2 Total CO2		0.0845	0.0000	244.0356	26.0249	270.1451
Bio- CO2						
PM2.5 Total		1.4000e- 004	0.000	0.2718	7.4800e- 003	0.2794
Exhaust PM2.5		1.4000e- 004	0.000.0	1.8000e- 003	7.4800e- 003	9.4200e- 003
Fugitive PM2.5				0.2700		0.2700
PM10 Total		1.4000e- 004	0.0000	2.3478	7.4800e- 003	2.3554
Exhaust PM10	lb/day	1.4000e- 1.4000e- 004 004	0.0000	1.9200e- 003	7.4800e- 7 003	9.5400e- 003
Fugitive PM10)/q			2.3458		2.3458
S02		0.0000	0.0000	2.3900e- 2 003	2.4000e- 004	2.6300e- 003
00		0.0395	0.0000	1.3072	0.1846	1.5313
×ON		3.6000e- 0.0395 0.0000 004	0.000.0	0.1653	0.1659	0.3316
ROG		5.3456	0.0000	0.1733	0.0509	5.5698
	Category	Area	Energy	Mobile	Stationary	Total

CO2e	0.00
N20	00'0
СН4	0.00
Total CO2	0.00
NBio-CO2	0.00
Bio- CO2 NBio-CO2 Total CO2	0.00
PM2.5 Total	0.00
Exhaust PM2.5	0.00
Fugitive PM2.5	0.00
PM10 Total	0.00
Exhaust PM10	00'0
Fugitive PM10	00'0
S02	0.00
00	0.00
XON	0.00
ROG	0.00
	Percent Reduction

3.0 Construction Detail

Construction Phase

Days Phase Description	23	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	21
Num Days Week	5	5 129	5 21
End Date	12/31/2021	6/30/2022	7/31/2022 5
Start Date	12/1/2021	1/1/2022	nstruction 7/1/2022
Phase Type	ation		Building Construction
Phase Name	Site Preparation	Site Cleanup	PV System Installation
Phase Number	-	2	3

Brawley Solar Energy Facility - Imperial County, Summer

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Acres of Grading (Grading Phase): 258

Acres of Paving: 233.19

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

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Bore/Drill Rigs	2	8.00	221	0.50
Site Preparation	Excavators	2	8.00	158	0.38
Site Preparation	Rubber Tired Dozers	ε -	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	26	0.37
Site Cleanup	Graders	2	8.00	187	0.41
Site Cleanup	Rubber Tired Dozers	2	8.00	247	0.40
Site Cleanup	Rubber Tired Loaders	2	8.00	203	0.36
Site Cleanup	Tractors/Loaders/Backhoes	2	8.00	26	0.37
PV System Installation	Aerial Lifts	2	8.00	63	0.31
PV System Installation	Air Compressors		8.00	78	0.48
PV System Installation	Cranes	2	8.00	231	0.29
PV System Installation	Forklifts	r I	8.00	68	0.20
PV System Installation	Generator Sets		8.00	84	0.74
PV System Installation	Tractors/Loaders/Backhoes	С	7.00	26	0.37
PV System Installation	Welders	1-	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Worker Trip Count Number	Worker Trip Number	Vendor Trip Number	ndor Trip Hauling Trip Number Number	Worker Trip Length	Vendor Trip Hauling Trip Length Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Vendor Hauling Vehicle Class
Site Preparation	11	240.00	00.9	00:00	7.30		20.00		HDT_Mix HHDT	ННОТ
Site Cleanup	8	240.00	00.9	0.00	7.30	8.90	į	 	HDT_Mix HHD	HHDT

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	HHDT	HDT_Mix	20.00;LD_Mix	8.90	7.30	00.00	300.00	240.00	13.	PV System Installation
_	FOLIA		.:N. G. 1.00.00		- 20.		-00 000	00000		
ı										

3.1 Mitigation Measures Construction

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2021

Unmitigated Construction On-Site

CO2e		0.0000	6,562.803 6	6,562.803 6
N20				
CH4	ay		2.1055	2.1055
Total CO2	lb/day	0.000.0	6,510.165 6	6,510.165 6
Bio- CO2 NBio- CO2 Total CO2			6,510.165 6,510.165 6 6	6,510.165 6,510.165 6 6
Bio- CO2				
PM2.5 Total		11.0608	2.2417	13.3025
Exhaust PM2.5		0.0000 28.5329 11.0608 0.0000 11.0608	2.2417	2.2417 13.3025
Fugitive PM2.5		11.0608		30.9696 11.0608
PM10 Total		28.5329	2.4366	30.9696
Exhaust PM10	b/day	0.0000	2.4366	2.4366
Fugitive PM10)/q	28.5329		28.5329
S02			0.0672	0.0672
00			31.8458	31.8458
XON			4.8629 50.8494 31.8458	4.8629 50.8494 31.8458 0.0672 28.5329
ROG			4.8629	4.8629
	Category	Fugitive Dust	Off-Road	Total

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Unmitigated Construction Off-Site 3.2 Site Preparation - 2021

			' _~		60
CO2e		0.0000	159.1493	1,369.457 6	1,528.606 9
N20		0.0000 0.0000 0.0000 0.0000 0.0000	0.0214	0.0488	0.0702
CH4	lay	0.000.0	1.0100e- 003	0.0594	0.0604
Total CO2	lb/day	0.000.0	152.7438	1,353.428 4	1,506.172 1,506.172 0.0604 3
Bio- CO2 NBio- CO2 Total CO2		0.0000	152.7438 152.7438 1.0100e- 0.0214 159.1493 003	1,353.428 1,353.428 0.0594 4 4	1,506.172 3
Bio- CO2					
PM2.5 Total		0.0000	0.4331	13.8785	14.3116
Exhaust PM2.5		0.0000 0.0000 0.0000 0.0000 0.0000	6.8300e- 003	7.4000e- 003	0.0142
Fugitive PM2.5		0.000.0	0.4263	13.8711	14.2974
PM10 Total		0.000.0	4.2095	137.5903 13.8711 7.4000e- 003	141.7998
Exhaust PM10	lb/day	0.0000	7.1300e- 003	8.0400e- 003	0.0152
Fugitive PM10)/q	0.000.0	4.2024	137.5822	141.7846
S02		0.000.0	1.4500e- 003	7.7429 0.0134 137.5822	0.0148 141.784
00		0.000.0	0.1436	7.7429	7.8864
NOx		0.0000 0.0000 0.0000 0.0000	0.3494	0.5588	0.9082
ROG		0.0000	0.0205	1.2310	1.2515
	Category	Hauling	Vendor	Worker	Total

Mitigated Construction On-Site

			' m	m
CO2e		0.0000	6,562.803 6	6,562.803 6
N20				
CH4	эх		2.1055	2.1055
Total CO2	lb/day	0.000.0	6,510.165 6	6,510.165 6
NBio- CO2			0.0000 6,510.165 6,510.165 6 6	0.0000 6,510.165 6,510.165 6 6
Bio- CO2 NBio- CO2 Total CO2 CH4			0.0000	0.000
PM2.5 Total		4.9774	2.2417	7.2191
Exhaust PM2.5		0.0000 12.8398 4.9774 0.0000 4.9774	2.2417	2.2417
Fugitive PM2.5		4.9774	r 	4.9774
PM10 Total		12.8398	2.4366	15.2764
Exhaust PM10	b/day	0.0000	2.4366	2.4366
Fugitive PM10	o/qı	12.8398		12.8398
802			0.0672	0.0672
00			31.8458	31.8458
×ON			4.8629 50.8494 31.8458 0.0672	4.8629 50.8494 31.8458 0.0672 12.8398
ROG			4.8629	4.8629
	Category	Fugitive Dust	Off-Road	Total

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site 3.2 Site Preparation - 2021

		l			ဖ
CO2e		0.0000	159.1493	1,369.457 6	1,528.606 9
NZO		0.0000 0.0000 0.0000 0.0000	0.0214	0.0488	0.0702
CH4	lb/day	0.0000	1.0100e- 003	0.0594	0.0604
Total CO2)/q	0.000.0	152.7438 152.7438 1.0100e- 003	1,353.428 1,353.428 4 4	1,506.172 1,506.172 3
Bio- CO2 NBio- CO2 Total CO2		0.0000	152.7438	1,353.428 4	1,506.172 3
Bio- CO2		1-0-0-0-0	; ; ; ; ;		
PM2.5 Total		0.0000	0.1673	5.1565	5.3237
Exhaust PM2.5		0.0000 0.0000 0.0000 0.0000	6.8300e- 003	7.4000e- 003	0.0142
Fugitive PM2.5		0.0000	0.1604 6.8300e- 003	5.1491	5.3095
PM10 Total		0.0000	1.5511	50.3694	51.9205
Exhaust PM10	lb/day	0.0000	7.1300e- 003	8.0400e- 003	0.0152
Fugitive PM10)/q		İ	50.3614	51.9053
S02		0.0000	1.4500e- 003	0.0134	0.0148
00		0.0000 0.0000 0.0000 0.0000	0.3494 0.1436 1.4500e- 1.5439 003	7.7429 0.0134	7.8864 0.0148 51.9053
NOx		0.0000	0.3494	0.5588	0.9082
ROG		0.0000	0.0205 0	1.2310	1.2515
	Category	Hauling	Vendor	Worker	Total

Unmitigated Construction On-Site 3.3 Site Cleanup - 2022

CO2e		0.0000	4,788.844 8	4,788.844 8
N20				
CH4	ay		1.5364	1.5364
Total CO2	lb/day	0.0000	4,750.435 4,750.435 1.5364 1	4,750.435 4,750.435 1
Bio- CO2 NBio- CO2 Total CO2			4,750.435 4,750.435 1	4,750.435
Bio- CO2				
PM2.5 Total		6.8495	1.4281	8.2776
Exhaust PM2.5		0.0000 14.1652 6.8495 0.0000 6.8495	1.4281	1.4281
Fugitive PM2.5		6.8495		6.8495
PM10 Total		14.1652	1.5523	15.7175
Exhaust PM10	łay	0.0000	1.5523	1.5523
Fugitive PM10	lb/day	-		14.1652
S02			3.4164 37.5037 18.1458 0.0490	3.4164 37.5037 18.1458 0.0490 14.1652
CO			18.1458	18.1458
NOX			37.5037	37.5037
ROG			3.4164	3.4164
	Category	Fugitive Dust	Off-Road	Total

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Brawley Solar Energy Facility - Imperial County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Cleanup - 2022

Unmitigated Construction Off-Site

Je Je		00	824	870	453
CO2e		0.00	155.5824	1,330.870 6	1,486.453 0
N2O		0.0000 0.0000 0.0000 0.0000	0.0208	0.0448	0.0656
CH4	lb/day	0.0000	149.3641 149.3641 8.0000e- 004	0.0533	0.0541
Total CO2)/qı	0.0000	149.3641	1,316.181 1,316.181 6 6	1,465.545 1,465.545 7 7
Bio- CO2 NBio- CO2 Total CO2		0.0000	149.3641	1,316.181 6	1,465.545 7
Bio- CO2		1-2-2-2-	; ; ; ; ;		
PM2.5 Total		0.0000	0.4302	13.8780	14.3082
Exhaust PM2.5		0.0000	3.9100e- 003	6.8800e- 003	0.0108
Fugitive PM2.5		0.0000	0.4263	0.0129 137.5822 7.4700e- 137.5897 13.8711 003	0.0116 141.7962 14.2974
PM10 Total		0.0000	4.0900e- 4.2065 003	137.5897	141.7962
Exhaust PM10	lb/day	0.0000	4.0900e- 003	7.4700e- 003	
Fugitive PM10	/qI	0.0000	4.2024	137.5822	0.0144 141.7846
SO2		0.0000	1.4200e- 003	0.0129	0.0144
00		0.0000	0.1259	7.0125	7.1385
×ON		0.0000	0.2892	0.4929	1.1493 0.7822 7.1385
ROG		0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	0.0161 0.2892 0.1259 1.4200e-	1.1333	1.1493
	Category		Vendor	Worker	Total

Mitigated Construction On-Site

0		0	4	44
CO2e		0.0000	4,788.844 8	4,788.844 8
N20				
CH4	ay		1.5364	1.5364
Total CO2	lb/day	0.000.0	4,750.435 1	4,750.435 1
Bio- CO2 NBio- CO2 Total CO2			0.0000 4,750.435 4,750.435 1.5364	0.0000 4,750.435 4,750.435
Bio- CO2				
PM2.5 Total		3.0823	1.4281	4.5104
Exhaust PM2.5		0.000	1.4281	1.4281
Fugitive PM2.5		3.0823 0.0000		3.0823
PM10 Total		0.0000 6.3743	1.5523	7.9266
Exhaust PM10	day	0.0000	1.5523	1.5523
Fugitive PM10	lb/day	6.3743		6.3743
805			0.0490	0.0490
00			18.1458	18.1458
XON			3.4164 37.5037 18.1458 0.0490	3.4164 37.5037 18.1458 0.0490
ROG			3.4164	3.4164
	Category	Į	Off-Road	Total

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Brawley Solar Energy Facility - Imperial County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Cleanup - 2022
Mitigated Construction Off-Site

			4	2	23
CO2e		0.0000	155.5824	1,330.870 6	1,486.453 0
NZO		0.0000 0.0000 0.0000 0.0000	0.0208	0.0448	0.0656
CH4	lb/day	0.0000	8.0000e- 004	0.0533	0.0541
Bio- CO2 NBio- CO2 Total CO2)/qI	0.0000	149.3641 149.3641	1,316.181 1,316.181 6 6	1,465.545 7
NBio- CO2		0.0000	149.3641	1,316.181 6	1,465.545 7
Bio- CO2		1-8-8-8-8	; ; ; ; ; ;	, , , , , ,	
PM2.5 Total		0.0000	0.1643	5.1559	5.3203
Exhaust PM2.5		0.0000 0.0000 0.0000 0.0000	1 3.9100e- 003	6.8800e- 003	0.0108
Fugitive PM2.5		0.0000	0.160	5.1491	5.3095
PM10 Total		0.000.0	1.5480	50.3689	51.9169
Exhaust PM10	lb/day	0.0000	4.0900e- 003	7.4700e- 003	0.0116
Fugitive PM10)/q	_	i	50.3614	51.9053
S02		0.0000	1.4200e- 003	7.0125 0.0129	0.0144
00		0.0000 0.0000 0.0000 0.0000			7.1385
NOX		0.0000	0.2892	0.4929	0.7822
ROG		0.0000	0.0161	1.1333	1.1493
	Category	Hauling	Vendor	Worker	Total

3.4 PV System Installation - 2022 Unmitigated Construction On-Site

CO2e		3,907.143 9	3,907.143 9
N20			
CH4	ay	0.9449	0.9449
Total CO2	lb/day	3,883.521 5	3,883.521 5
Bio- CO2 NBio- CO2 Total CO2		3,883.521 3,883.521 0.9449 5 5	3,883.521 3,883.521 5 5
Bio- CO2			
PM2.5 Total		1.0691	1.0691
Exhaust PM2.5		1.0691	1.0691
Fugitive PM2.5			
PM10 Total		1.1342	1.1342
Exhaust PM10	lay	1.1342	1.1342
Fugitive PM10	lb/day		
SO2		0.0408	0.0408
00		23.0984	23.0984
XON		23.3215	2.4707 23.3215 23.0984 0.0408
ROG		2.4707 23.3215 23.0984 0.0408	2.4707
	Category	Off-Road	Total

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 PV System Installation - 2022 Unmitigated Construction Off-Site

CO2e		0.0000	7,779.120 6	1,330.870 6),109.991 1
NZO		0.0000 0.0000 0.0000 0.0000	1.0400 7,779.120 6	0.0448 1	1.0848 9,109.991
CH4	ý	0.000.0	0.0402	0.0533	0.0934
Total CO2	lb/day	0.0000	7,468.204 9	1,316.181 6	8,784.386 4
Bio- CO2 NBio- CO2 Total CO2		0.0000	7,468.204 7,468.204 0.0402 9 9	1,316.181 1,316.181 6 6	8,784.386 8,784.386 4 4
Bio- CO2			 ! !	 !	
PM2.5 Total		0.0000	21.5092	13.8780	35.3872
Exhaust PM2.5		0.0000 0.0000 0.0000 0.0000	0.1955	6.8800e- 003	0.2024
Fugitive PM2.5		0.0000	21.3137	13.8711	35.1849
PM10 Total		0.0000	210.3226 21.3137	137.5897	347.9123
Exhaust PM10	lay	0.0000	0.2043	7.4700e- 003	0.2118
Fugitive PM10	lb/day	0.000.0	210.1182	0.0129 137.5822 7.4700e- 137.5897 13.8711 003	0.0839 347.7005
S02		0.000.0	0.0710	0.0129	0.0839
00		0.000.0	6.2971	7.0125	13.3096
×ON		0.0000	14.4610	0.4929	14.9539 13.3096
ROG		0.0000 0.0000 0.0000 0.0000	0.8027	1.1333	1.9359
	Category	Hauling	Vendor	Worker	Total

Mitigated Construction On-Site

CO2e		3,907.143 9	3,907.143 9
NZO			
CH4	ау	0.9449	0.9449
Total CO2	lb/day	3,883.521 5	3,883.521 5
Bio- CO2 NBio- CO2 Total CO2		3,883.521 5	0.0000 3,883.521 3,883.521 0.9449
Bio- CO2		0.0000 3,883.521 3,883.521 0.9449	0.000
PM2.5 Total		1.0691	1.0691
Exhaust PM2.5		1.0691 1.0691	1.0691
Fugitive PM2.5			
PM10 Total		1.1342 1.1342	1.1342
Exhaust PM10	day	1.1342	1.1342
Fugitive PM10	lb/day		
SO2		0.0408	0.0408
00		23.0984	23.0984
×ON		23.3215	2.4707 23.3215 23.0984 0.0408
ROG		2.4707 23.3215 23.0984 0.0408	2.4707
	Category	Off-Road	Total

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 PV System Installation - 2022

Mitigated Construction Off-Site

CO2e		0.0000	00 7,779.120 6	1,330.870 6	9,109.991 1
N20		0.000.0	1.0400	0.0448	1.0848
CH4	ay	0.000.0	0.0402	0.0533	0.0934
Total CO2	lb/day	0.0000 0.0000 0.0000 0.0000	7,468.204 9	1,316.181 6	8,784.386 4
Bio- CO2 NBio- CO2 Total CO2		0.0000	7,468.204 7,468.204 9 9	1,316.181 1,316.181 6 6	8,784.386 8,784.386 4 4
Bio- CO2			 		
PM2.5 Total		0.0000	8.2170	5.1559	13.3729
Exhaust PM2.5		0.0000 0.0000 0.0000 0.0000	0.1955	6.8800e- 003	0.2024
Fugitive PM2.5		0.000.0	8.0215	5.1491	13.1706
PM10 Total		0.000.0	77.4004	50.3689	127.7693
Exhaust PM10	b/day	0.0000	0.2043	7.4700e- 003	0.2118
Fugitive PM10	p/qı	0.0000	77.1961	50.3614	127.5575
S02		0.0000	0.0710 77.1961	0.0129 50.3614	0.0839
00		0.000.0	6.2971	7.0125	13.3096
NOX		0.0000	14.4610	0.4929	14.9539 13.3096 0.0839 127.5575
ROG		0.0000 0.0000 0.0000 0.0000	0.8027	1.1333	1.9359
	Category	Hauling	Vendor	Worker	Total

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

CO2e		247.8760	247.8760
NZO		244.0356 244.0356 0.0125 0.0118 247.8760	244.0356 244.0356 0.0125 0.0118 247.8760
CH4	ау	0.0125	0.0125
Total CO2	lb/day	244.0356	244.0356
Bio- CO2 NBio- CO2 Total CO2		244.0356	244.0356
Bio- CO2			
PM2.5 Total		0.2718	0.2718
Exhaust PM2.5		1.8000e- 003	1.9200e- 2.3478 0.2700 1.8000e- 0.2718 003 003
Fugitive PM2.5		0.2700	0.2700
PM10 Total		2.3478	2.3478
Exhaust PM10	lb/day	1.9200e- 003	1.9200e- 003
Fugitive PM10)/q	2.3458	2.3458
S02		2.3900e- 003	2.3900e- 003
00		1.3072	1.3072
XON		0.1653	0.1653
ROG		0.1733 0.1653 1.3072 2.3900e- 2.3458 1.9200e- 2.3478 0.2700 1.8000e- 0.2718 0.3718 0.3700 0.3	0.1733 0.1653 1.3072 2.3900e- 2.3458 003
	Category	Mitigated	Unmitigated

4.2 Trip Summary Information

	Aver	Average Daily Trip Rate	ate	Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Manufacturing	00:00	00.00	00:00		
Other Non-Asphalt Surfaces	00.00	00.00			
Other Non-Asphalt Surfaces	00:00	00.00	00:00		
		40.32	0.00	14,869	14,869
Total	0.00	40.32	0.00	14,869	14,869

4.3 Trip Type Information

		Miles			7rip %			Trip Purpose %	% c
Land Use	H-W or C-W	H-S or C-C	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	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Manufacturing 6.70	6.70	5.00	8.90	29.00	28.00	13.00	95	2	င
Other Non-Asphalt Surfaces 6.70	6.70	5.00	8.90	00.00	0.00	00.00	0	0	0
Other Non-Asphalt Surfaces	6.70	5.00	8.90	00.00	0.00	00:00	0	0	0
Refrigerated Warehouse-No	6.70	5.00	8.90	29.00	00.0	41.00	92	5	က

4.4 Fleet Mix

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LDA 0.516491	LDA LDT1 LDT2 MDV LHD1 LHD2 MHD HHD OBUS UBUS MCY SBUS MH MH OBUS UBUS MCY SBUS MH	LDT2 0.1803501	MDV 0.154783	LHD1	LHD2	MHD 0	HHD	OBUS 0 0009191	LDA LDT1 LDT2 MDV LHD1 LHD2 MHD HHD OBUS UBUS MCY 0.546491 0.056473 0.184350 0.154783 0.028319 0.0069561 0.0069561 0.0166001 0.0009191 0.0001231 0.0228551	MCY	SBUS	MH 0.003771
6491 0.059473	473	0.516491 0.059473 0.180350 0.154783 0.0028319 0.006956 0.008567 0.016600 0.000919 0.000123 0.022855 0.000793 0.003771	0.154783	0.028319	0.006956	0.008567	0.016600	0.000919	0.000123	0.022855	0.000793	0.003771
0.05947;	-+	Refrigerated Warehouse-No Rail 0.516491 0.059473 0.180350 0.154783 0.028319 0.006956 0.008567 0.016600 0.000919 0.000123 0.022855 0.000793 0.003771	0.154783	783 0.028319	0.006956 0.008567 0.016600 0.000919 0.000123 0.022855 0.000793	0.008567	0.016600	0.000919	0.000123	0.022855	0.000793	0.003771

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Kilowatt Hours of Renewable Electricity Generated

CO2e		0.0000	0.0000
NZO		0.0000 0.0000 0.0000 0.0000	
CH4	ay	0.0000	0.0000 0.0000 0.0000
Total CO2	lb/day	0.0000	0.0000
NBio- CO2		0.0000	0.0000
Bio- CO2 NBio- CO2 Total CO2			
PM2.5 Total		0.0000	0.0000
Exhaust PM2.5			0.0000
Fugitive PM2.5			
PM10 Total		0.0000	0.0000
Exhaust PM10	lb/day	0.000.0	0.0000
Fugitive PM10)/qI		
SO2		0.0000	0.0000
00		0.0000	0.0000
×ON		0.0000	0.0000
ROG		0.0000 0.0000 0.0000	0.0000 0.0000 0.0000
	Category	NaturalGas Mitigated	: · · · ·

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Brawley Solar Energy Facility - Imperial County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

CO2e		0.0000	0.000.0	0.000.0	0.0000
N2O		L	0.0000	0.0000	0.0000
CH4	ay	0.0000 0.0000 0.0000		0.0000	0.0000
Total CO2	lb/day	0.000.0	0.0000	0.000.0	0.0000
Bio- CO2 NBio- CO2 Total CO2		0.000.0	0.000.0	0.000.0	0.0000
Bio- CO2			 		
PM2.5 Total		0.0000	0.0000	0.0000	0.0000
Exhaust PM2.5		0.0000	0.0000	0.0000	0.0000
Fugitive PM2.5					
PM10 Total		0.0000 0.0000	0.000.0	0.0000	0.0000
Exhaust PM10	lb/day	0.000.0	0.0000	0.000.0	0.0000
Fugitive PM10)/qI				
SOS		0.0000	0.0000	0.0000	0.0000
00		0.0000	0.0000	0.0000	0.0000 0.0000
×ON		0.0000	0.0000	0.0000	0.0000
ROG		0.0000 0.0000 0.0000	0.0000	0.0000	0.0000
NaturalGa s Use	kBTU/yr	0	0	0	
	Land Use	Manufacturing	Other Non- Asphalt Surfaces	Refrigerated Warehouse-No Rail	Total

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Mitigated

		00000 000000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000
CH4	ау	0.0000	0.0000	0.0000	0.000
Total CO2	lb/day	0.0000 0.0000 0.0000	0.000.0	0.0000	0.000
Bio- CO2 NBio- CO2 Total CO2		0.000.0	0.000.0	0.0000	0.000.0
Bio- CO2			 		
PM2.5 Total		0.0000 0.0000	0.0000	0.0000	0.0000
Exhaust PM2.5		0.0000	0.0000	0.0000	0.0000
Fugitive PM2.5					
PM10 Total		0.0000 0.0000	0.0000	0.0000	0.0000
Exhaust PM10	lb/day	0.0000	0.0000	0.0000	0.0000
Fugitive PM10	/qı				
SO2		0.0000		0.0000	0.0000
00		0.0000 0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000 0.0000
×ON		0.0000			
ROG		0.0000	0.0000	0.0000	0.0000
NaturalGa s Use	kBTU/yr	0	0	0	
	Land Use	Manufacturing 0	Other Non- Asphalt Surfaces	Refrigerated Warehouse-No Rail	Total

6.0 Area Detail

6.1 Mitigation Measures Area

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Brawley Solar Energy Facility - Imperial County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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0.0901 0.0901 CO2e N20 0.0845 0.0845 2.2000e-004 0.0845 2.2000e-CH4 lb/day Bio- CO2 NBio- CO2 Total CO2 0.0845 1.4000e- 1.4000e-004 004 1.4000e- 1.4000e-004 004 PM2.5 Total Exhaust PM2.5 Fugitive PM2.5 1.4000e- 1.4000e-004 004 1.4000e- 1.4000e-004 004 PM10 Total Exhaust PM10 lb/day Fugitive PM10 5.3456 3.6000e 0.0395 0.0000 0.0000 **SO2** 3.6000e- 0.0395 004 00 Ň 5.3456 ROG Unmitigated Mitigated Category

6.2 Area by SubCategory

Unmitigated

CO2e		0.0000	0.0000	0.0901	0.0901
NZO					
CH4	ay			2.2000e- 004	2.2000e- 004
Total CO2	lb/day	0.000.0	0.0000	0.0845	0.0845
Bio- CO2 NBio- CO2 Total CO2			 	0.0845	0.0845
Bio- CO2			 ! ! ! !		
PM2.5 Total		0.000.0	0000.0	1.4000e- 004	1.4000e- 004
Exhaust PM2.5		0.0000 0.0000	0.000.0	1.4000e- 004	1.4000e- 004
Fugitive PM2.5			 	 	
PM10 Total		0.0000	0.0000	1.4000e- 004	1.4000e- 004
Exhaust PM10	//day	0.0000 0.0000	0.0000	1.4000e- 004	1.4000e- 004
Fugitive PM10	o/qı				
S02				0.0000	0.0000
00				0.0395	0.0395
NOX				3.6000e- 004	5.3456 3.6000e- 0.0395 004
ROG		1.7440	3.5979	3.6700e- 3.6000e- 003 004	5.3456
	SubCategory	Architectural 1.7440 Coating		Landscaping	Total

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Mitigated

CO2e		0.0000	0.0000	0.0901	0.0901
NZO					
CH4	ay		 	2.2000e- 004	2.2000e- 004
Total CO2	lb/day	0.000.0	0.0000	0.0845	0.0845
Bio- CO2 NBio- CO2 Total CO2			r ! ! ! !	0.0845	0.0845
Bio- CO2			 		
PM2.5 Total		0.0000	0.0000	1.4000e- 004	1.4000e- 004
Exhaust PM2.5		0.0000	0.0000	1.4000e- 004	1.4000e- 004
Fugitive PM2.5					
PM10 Total		0.0000	0.0000	. 1.4000e- 004	1.4000e- 004
Exhaust PM10	b/day	0.000.0	0.000.0	1.4000e- 004	1.4000e- 004
Fugitive PM10)/qı				
805				0.0000	0.0000
00				0.0395	0.0395
XON				3.6000e- 004	3.6000e- 004
ROG		1.7440	3.5979	3.6700e- 3.6000e- 003 004	5.3456
	SubCategory	Architectural Coating		Landscaping	Total

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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Brawley Solar Energy Facility - Imperial County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type
lergency Generator	1	0.5	26	62		0.73 Diesel

Boil

ergency Generator	1	0.5	26	62	0.73	0.73 Diesel
ilers						
Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type	

User Defined Equipment

Number
Equipment Type

10.1 Stationary Sources

Unmitigated/Mitigated

C02e		26.1162	26.1162
N20			
CH4	lay	3.6500e- 003	3.6500e- 003
Total CO2	lb/day	26.0249	26.0249
Bio- CO2 NBio- CO2 Total CO2		26.0249 26.0249 3.6500e-	26.0249
Bio- CO2			
PM2.5 Total		7.4800e- 003	7.4800e- 003
Exhaust PM2.5		7.4800e- 003	7.4800e- 003
Fugitive PM2.5			
PM10 Total		7.4800e- 7.4800e- 003 003	7.4800e- 003
Exhaust PM10	lb/day	7.4800e- 003	7.4800e- 003
Fugitive PM10			
SO2		2.4000e- 004	2.4000e- 004
00		0.1846	0.1846
XON		0.1659 0.1846 2.4000e-	0.1659 0.1846 2.4000e-
ROG		0.0509	0.0509
	Equipment Type	Emergency 0.0509 0 Generator - Diesel (50 - 75 HP)	Total

11.0 Vegetation

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Brawley Solar Energy Facility - Imperial County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Brawley Solar Energy Facility

Imperial County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Manufacturing	52.27	1000sqft	1.20	52,270.00	0
Refrigerated Warehouse-No Rail	100.80		2.31	:	0
Other Non-Asphalt Surfaces	9.70	Acre	9.70	422,532.00	0
Other Non-Asphalt Surfaces	223.49	Acre	223.49	9,735,224.40	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	3.4	Precipitation Freq (Days)	12
Climate Zone	15			Operational Year	2022
Utility Company	Imperial Irrigation District				
CO2 Intensity (Ib/MWhr)	189.98	CH4 Intensity (Ib/MWhr)	0.033	N2O Intensity (Ib/MWhr)	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Total Project Site = 227 acres. Total Offsite Power Lines = 9.7 acres

Construction Phase - Construction schedule provided by applicant

Off-road Equipment - PV System Installation: 2 Aerial Lifts, 1 Air Compressor, 2 Cranes, 3 Forklifts, 1 Generator Set, 1 Grader, 2 Off-Hwy Trucks, 3 Tractors-Loaders-Backhoes, 1 Welder Off-road Equipment - PV System Install: 2 Aerial Lifts, Air Compressor, 2 Cranes, 3 Forklifts, 1 Generator Set, 1 Grader, 2 Off-Hwy Trucks, 3 Tractors-Loaders-Backhoes, 1 Welder

Off-road Equipment - Site Cleanup: 2 Graders, 2 Rubber Tired Loaders, 2 Rubber Tired Dozers, and 2 Tractors-Loaders-Backhoes

Off-road Equipment - Site Preparation: 2 Bore-Drill Rigs, 2 Excavators, 3 Rubber Tired Dozers, and 4 Tractor-Loader-Backhoe

Trips and VMT - 6 vendor trips per day added to Site Prep and Site Cleanup to account for water truck emissions. All worker trips set to 240 per day

Brawley Solar Energy Facility - Imperial County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

On-road Fugitive Dust - 85% of trips on pavement. Per Rule ICAPCD Rule 805 F.1.c - Material Silt Content set to 3%

Grading - Total Acres Graded 227 acres (Site Preparation Phase)

Vehicle Trips - 40 daily trips on Saturdays.

Road Dust - 99% roads paved

Consumer Products - Consumer products set to zero, since no workers will typical be onsite

Energy Use - No natural gas will be used onsite. Electricity use set to 1,946,667 per year.

Water And Wastewater - The project will use 0.81 acre feet or 263,939 gallons per year.

Solid Waste - Operation of the project will not generate solid waste

Construction Off-road Equipment Mitigation - Water Exposed Area 2x per day selected to account for ICAPCD Rule 801. Unpaved Road Moisture Content 7% selected to account for ICAPCD Rule 805 F.1.d. Unpaved Road vehicle speed set to 15 mph per PDF 3.

Energy Mitigation - Solar panels will generate 51,840,000 kWh-year

Stationary Sources - Emergency Generators and Fire Pumps - Emergency diesel generator - 62 hp, 0.73 load factor, 0.5 hour per day 26 hour per year

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	2
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	4,650.00	21.00
tblConstructionPhase	NumDays	465.00	129.00
tblConstructionPhase	NumDays	180.00	23.00
tblConsumerProducts	ROG_EF	2.14E-05	0
tblEnergyUse	LightingElect	2.93	0.00
tblEnergyUse	LightingElect	2.37	0.00
tblEnergyUse	NT24E	5.02	0.00
tblEnergyUse	NT24E	36.52	0.00
tblEnergyUse	NT24NG	17.13	0.00
tblEnergyUse	NT24NG	48.51	0.00
tblEnergyUse	T24E	1.97	0.00
tblEnergyUse	T24E	0.95	19.31
tblEnergyUse	T24NG	15.20	0.00
tblEnergyUse	T24NG	3.22	0.00

Brawley Solar Energy Facility - Imperial County, Winter

OffRoadEquipmentUnitAmount OffRoadEquipmentUnitAmount
UsageHours
faterialSiltContent
laterial Sit Content
endorPercentPave
endorPercentPave
VendorPercentPave
WorkerPercentPave
orkerPercentPave
orkerPercentPave
RoadPercentPave
SolidWasteGenerationRate
SolidWasteGenerationRate
endorTripNumber
endorTripNumber
endorTripNumber
/orkerTripNumber
/orkerTripNumber
/orkerTripNumber
ST_TR
ST_TR
SU_TR
SU_TR
WD_TR
WD_TR

Brawley Solar Energy Facility - Imperial County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

0.00	263,939.00
12,087,437.50	IndoorWaterUseRate 23,310,000.00
IndoorWaterUseRate	
tblWater	tblWater

2.0 Emissions Summary

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Brawley Solar Energy Facility - Imperial County, Winter

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	×ON	00	S02	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Bio- CO2 NBio- CO2 Total CO2	CH4	N20	CO2e
Year					lb/day	lay							lb/day	ay		
2021	5.7537	5.7537 51.8179 37.6436 0.0800 170.317	37.6436	0.0800	170.3175	2.4518 172.7693 25.3583 2.2559 27.6142	172.7693	25.3583	2.2559		0.0000	7,813.763 3	0.0000 7,813.763 7,813.763 2.1680 0.0714 7,889.224 3 3 6	2.1680	0.0714	7,889.224 6
2022	4.2367	4.2367 39.7414 34.7570 0.1228 347.7005	34.7570	0.1228	347.7005	1.5639 349.0471 35.1849 1.4389	349.0471	35.1849	1.4389	36.4568	0.0000	12,479.96 58	0.0000 12,479.96 12,479.96 1.5926 1.0901 12,830.80 58 58 1.5926 1.5926 4.5	1.5926	1.0901	12,830.80 45
Maximum	5.7537	5.7537 51.8179 37.6436 0.1228 347.7005	37.6436	0.1228		2.4518 349.0471 35.1849 2.2559	349.0471	35.1849		36.4568	0.0000	12,479.96 58	0.0000 12,479.96 12,479.96 2.1680 1.0901 12,830.80 58	2.1680	1.0901	12,830.80 45

Mitigated Construction

C02e		7,889.224 6	12,830.80 45	12,830.80 45							
N20		0.0714	1.0901 12,830.80 45	1.0901 12,830.80 45							
CH4	ay	2.1680	1.5926	2.1680							
Total CO2	lb/day	7,813.763 3	12,479.96 58	12,479.96 58							
Bio- CO2 NBio- CO2 Total CO2		0.0000 7,813.763 7,813.763 2.1680 0.0714 7,889.224	0.0000 12,479.96 12,479.96 1.5926 58 58	0.0000 12,479.96 12,479.96 58 58							
Bio- CO2		0.0000	0.0000	0.000							
PM2.5 Total		12.5428	14.4425	14.4425							
Exhaust PM2.5		67.1969 10.2869 2.2559 12.5428		2.2559							
Fugitive PM2.5	lb/day	lb/day	/day	//day					10.2869	13.1706	13.1706
PM10 Total					67.1969	128.9040 13.1706 1.4389	2.4518 128.9040 13.1706				
Exhaust PM10					ʻday	ɔ/day	2.4518	1.5639	2.4518		
Fugitive PM10			64.7451	127.5575	127.5575						
S02		0.0800	0.1228	0.1228							
00			37.6436	34.7570	37.6436						
NOx		5.7537 51.8179 37.6436 0.0800 64.7451	39.7414 34.7570 0.1228 127.5575	51.8179 37.6436 0.1228 127.5575							
ROG		5.7537	4.2367	5.7537							
	Year	2021	2022	Maximum							

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Brawley Solar Energy Facility - Imperial County, Winter

1		
9	C02e	0.00
Applie	N20	00'0
icle Ruk	СН4	0.00
\FE Veh	Total CO2	00.00
ctors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied	PM2.5 Bio- CO2 NBio-CO2 Total CO2	00.0
ccount fo	Bio- CO2	0.00
cle to A	PM2.5 Total	57.88
uty Vehi	Exhaust PM2.5	00'0
Light D	Fugitive PM2.5	61.26
Gasoline	PM10 Total	62.42
tors for (Exhaust PM10	00'0
nent Fac	Fugitive PM10	62.88
EMFAC Off-Model Adjustment Fac	SO2	00'0
f-Model	00	00'0
MFAC OI	XON	00'0
Ξ	ROG	0.00
		Percent Reduction

2.2 Overall Operational

Unmitigated Operational

CH4 N2O CO2e	lb/day	2.2000e- 0.0901 004	0.0000 0.0000 0.0000	0.0131 0.0122 219.1206	3.6500e- 26.1162 003	0.0170 0.0122 245.3268
Bio- COZ NBio- COZ 10tal COZ)/qI	0.0845 0.0845	0.0000 0.0000	215.1702 215.1702 0.0131	26.0249 26.0249	241.2797 241.2797
PM2.5 Bio- Total		1.4000e- 004	0.000.0	0.2718	7.4800e- 003	0.2794
Exhaust PM2.5		1.4000e- 004	0.0000	1.8100e- 003	7.4800e- 003	9.4300e-
Fugitive PM2.5				0.2700		0.2700
PM10 Total		1.4000e- 004	0.0000	2.3478	7.4800e- 003	2.3554
Exhaust PM10	lb/day	1.4000e- 1.4000e- 004 004	0.0000	1.9200e- 003	7.4800e- 003	9.5400e-
Fugitive PM10	/qı			2.3458		2.3458
S02		0.0000	0.0000	1.0443 2.1100e- 2.3	2.4000e- 004	1.2684 2.3500e-
00		0.0395	0.0000	1.0443	0.1846	
NOX		5.3456 i 3.6000e- i 0.0395 i 0.0000 0.000	0.0000	0.1808	0.1659	0.3471
ROG		5.3456	0.0000	0.1121	0.0509	5.5086
	Category	Area	Energy	Mobile	Stationary	Total

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Brawley Solar Energy Facility - Imperial County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Mitigated Operational

				' .c.		
CO2e		0.0901	0.0000	219.1206	26.1162	245.3268
N20			0.0000	0.0122		0.0122
CH4	ay	2.2000e- 004	0.000.0	0.0131	3.6500e- 003	0.0170
Total CO2	lb/day	0.0845	0.000.0	215.1702	26.0249	241.2797
Bio- CO2 NBio- CO2 Total CO2		0.0845	0.0000	215.1702 215.1702	26.0249	241.2797 241.2797
Bio- CO2						
PM2.5 Total		1.4000e- 004	0.000	0.2718	7.4800e- 003	0.2794
Exhaust PM2.5		1.4000e- 004	0.000.0	1.8100e- 003	7.4800e- 003	9.4300e- 003
Fugitive PM2.5			 	0.2700	r	0.2700
PM10 Total			0.0000	2.3478	7.4800e- 003	2.3554
Exhaust PM10		1.4000e- 004	0.0000	1.9200e- 003	7.4800e- 003	9.5400e- 003
Fugitive PM10	lb/day		 	2.3458		2.3458
S02		0.000.0	0.0000	2.1100e- 003	2.4000e- 004	2.3500e- 003
00		0.0395	0.0000	1.0443	0.1846	1.2684
NOX		5.3456 3.6000e- 0.0395 004	0.0000		0.1659	0.3471
ROG		5.3456		0.1121	0.0509	5.5086
	Category	Area	Energy	Mobile	Stationary	Total

-800	COze	0.00
9014	NZN	00'0
	CH4	00'0
COO I-Y-F	lotal COZ	00'0
200	BIO- COZ NBIO-COZ IOGAI COZ	0.00
-:-	BIO- CO2	0.00
	Total	0.00
1000	Exnaust PM2.5	00'0
	Fugitive PM2.5	00'0
O. Paris	Total	0.00
1000	Exnaust PM10	0.00
	Fugitive PM10	0.00
	208	0.00
8	3	00'0
CIA	NOX	00'0
000	ROG	00'0
		Percent Reduction

3.0 Construction Detail

Construction Phase

		,	
Phase Description			
Num Days	23	129	21
Num Days Num Days Week	2	2	5
End Date	12/31/2021	6/30/2022	7/31/2022
Start Date		1/1/2022	7/1/2022
Phase Type	Site Preparation	! ! ! ! ! !	Building Construction
Phase Name	ration	0	PV System Installation
Phase Number	_	2	က

Acres of Grading (Site Preparation Phase): 227

Brawley Solar Energy Facility - Imperial County, Winter

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Acres of Grading (Grading Phase): 258

Acres of Paving: 233.19

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

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Bore/Drill Rigs	2	8.00	221	0.50
Site Preparation	Excavators	2	8.00	158	0.38
Site Preparation	Rubber Tired Dozers	r I	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	26	0.37
Site Cleanup	Graders	2	8.00	187	0.41
Site Cleanup	Rubber Tired Dozers	2	8.00	247	0.40
Site Cleanup	Rubber Tired Loaders	2	8.00	203	0.36
Site Cleanup	Tractors/Loaders/Backhoes	2	8.00	26	0.37
PV System Installation	Aerial Lifts	2	8.00	63	0.31
PV System Installation	Air Compressors		8.00	78	0.48
PV System Installation	Cranes	2	8.00	231	0.29
PV System Installation	Forklifts	r I	8.00	68	0.20
PV System Installation	Generator Sets		8.00	84	0.74
PV System Installation	Tractors/Loaders/Backhoes	r I	7.00	26	0.37
PV System Installation	Welders	1	8.00	46	0.45

Trips and VMT

Hauling hicle Class	Ţ	Τ
ass Vehi	呈	HHDT
Venicle Class Vehicle Class	HDT_Mix HHDT	HDT_Mix HHD
Worker Vehicle Class		
Hauling Trip Length	20.00	
Vendor Trip Length	8.90	8.90
Worker Trip Length	7.30	7.30
Hauling Trip Number	00:00	00:00
Vendor Trip Number		6.00
Worker Trip Number	240.00	240.00
Offroad Equipment Count	111	8 240.00
Phase Name	Site Preparation	Site Cleanup

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HHDT

HDT_Mix

20.00 LD_Mix

8.90

7.30

0.00

300.00

240.00

13

PV System Installation

Brawley Solar Energy Facility - Imperial County, Winter

Applied
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EMFAC Off-M
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3.1 Mitigation Measures Construction

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2021

Unmitigated Construction On-Site

CO2e		0.000	6,562.803 6	6,562.803 6
N20				
CH4	яу		2.1055	2.1055
Fotal CO2	lb/day	0.000.0	3,510.165 6	3,510.165 6
NBio- CO2			6,510.165 6,510.165 6 6	6,510.165 6,510.165 2.1055 6 6
Bio-CO2 NBio-CO2 Total CO2 CH4				
PM2.5 Total		11.0608	2.2417	13.3025
Exhaust PM2.5		0.0000 28.5329 11.0608 0.0000 11.0608	2.2417	30.9696 11.0608 2.2417 13.3025
Fugitive PM2.5		11.0608	 	11.0608
PM10 Total		28.5329	2.4366	30.9696
Exhaust PM10	ау	0.000.0	2.4366	2.4366
Fugitive PM10	lb/day		 	28.5329
S02			0.0672	0.0672
00			31.8458	4.8629 50.8494 31.8458 0.0672 28.5329
XON			50.8494 31.8458	50.8494
ROG			4.8629	4.8629
	Category	Fugitive Dust	Off-Road	Total

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Brawley Solar Energy Facility - Imperial County, Winter

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Site Preparation - 2021

Unmitigated Construction Off-Site

CO2e		0.0000	159.2931	1,167.127 9	1,326.421 0
N20		0.0000	0.0215	0.0499 1,167.127 9	0.0714
CH4	ay	0.0000	9.9000e- 004	0.0615	0.0625
Total CO2	lb/day	0.0000 0.0000 0.0000 0.0000	152.8621	1,150.735 6	1,303.597 1,303.597 0.0625 0.0714 1,326.421 6 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
NBio- CO2		0.0000	152.8621 152.8621 9.9000e- 004	1,150.735 1,150.735 0.0615 6 6	1,303.597 6
Bio- CO2 NBio- CO2 Total CO2					
PM2.5 Total		0.0000	0.4331	13.8785	14.3117
Exhaust PM2.5		0.0000 0.0000 0.0000 0.0000	0.4263 6.8400e- 003	7.4000e- 003	0.0152 141.7998 14.2974 0.0142 14.3117
Fugitive PM2.5		0.000.0	0.4263	137.5903 13.8711 7.4000e- 003	14.2974
PM10 Total		0.000.0	4.2095	137.5903	141.7998
Exhaust PM10	day	0.0000	7.1500e- 003	8.0400e- 003	
Fugitive PM10	lb/day	_		137.5822	0.9685 5.7978 0.0128 141.7846
802		0.0000	1.4500e- 003	5.6500 0.0114 137.5822	0.0128
00		0.0000	0.1478	5.6500	5.7978
×ON		0.0000 0.0000 0.0000 0.0000	0.0198 0.3846 0.1478 1.4500e- 4.2024 003	0.5839	0.9685
ROG		0.0000	0.0198	0.8710	0.8908
	Category	Hauling	Vendor	Worker	Total

Mitigated Construction On-Site

		0	33	63
CO2e		0.0000	6,562.803 6	6,562.803 6
NZO				
CH4	lay		2.1055	2.1055
Total CO2	lb/day	0.000.0	6,510.165 6	6,510.165 6
Bio- CO2 NBio- CO2 Total CO2			0.0000 6,510.165 6,510.165 2.1055 6 6	0.0000 6,510.165 6,510.165 6 6
Bio- CO2			0.0000	0.000.0
PM2.5 Total		4.9774	2.2417	7.2191
Exhaust PM2.5		0.0000 12.8398 4.9774 0.0000 4.9774	2.2417	2.2417
Fugitive PM2.5		4.9774		4.9774
PM10 Total		12.8398	2.4366	15.2764
Exhaust PM10	lb/day	0.0000	2.4366	2.4366
Fugitive PM10)/qı	12.8398		12.8398
805			0.0672	0.0672
00			31.8458	31.8458
XON			4.8629 50.8494 31.8458	4.8629 50.8494 31.8458 0.0672 12.8398
ROG			4.8629	4.8629
	Category	Fugitive Dust	Off-Road	Total

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Brawley Solar Energy Facility - Imperial County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site 3.2 Site Preparation - 2021

		<u> </u>		· .	
CO2e		0.0000	159.2931	1,167.127 9	1,326.421 0
N20		0.0000	0.0215	0.0499	0.0714
CH4	ау	0.000.0	9.9000e- 004	0.0615	0.0625
Total CO2	lb/day	0.000.0	152.8621	1,150.735 6	1,303.597 6
Bio- CO2 NBio- CO2 Total CO2		0.0000 0.0000 0.0000 0.0000	152.8621 152.8621	1,150.735 1,150.735 6 6	1,303.597 6
Bio- CO2			 	 	
PM2.5 Total		0.0000	0.1673	5.1565	5.3237
Exhaust PM2.5			6.8400e- C	7.4000e- 003	0.0142
Fugitive PM2.5		0.000.0	0.1604	5.1491	5.3095
PM10 Total		0.0000 0.0000 0.0000	1.5511	50.3694	51.9205
Exhaust PM10	lay	0.0000	7.1500e- 003	8.0400e- 003	0.0152
Fugitive PM10	lb/day	0.0000	1.5439	50.3614	51.9053
S02		0.0000	0.1478 1.4500e- 003	5.6500 0.0114 50.3614	0.0128
00		0.000.0	0.1478		5.7978
XON		0.0000 0.0000 0.0000 0.0000	0.0198 0.3846	0.8710 0.5839	0.9685
ROG		0.0000	0.0198	0.8710	8068.0
	Category	Hauling	Vendor	Worker	Total

Unmitigated Construction On-Site 3.3 Site Cleanup - 2022

CO2e		0.0000	4,788.844 8	4,788.844 8
N20				
CH4	ay		1.5364	1.5364
Total CO2	lb/day	0.000.0	4,750.435 1	4,750.435
NBio- CO2			4,750.435 4,750.435 1.5364 1	4,750.435 4,750.435
Bio- CO2 NBio- CO2 Total CO2			 	
PM2.5 Total		6.8495	1.4281	8.2776
Exhaust PM2.5		0.000.0	1.4281	1.4281
Fugitive PM2.5			 	6.8495
PM10 Total		0.0000 14.1652 6.8495	1.5523	15.7175
Exhaust PM10	łay	0.0000	1.5523	1.5523
Fugitive PM10	lb/day	14.1652		14.1652
S02			0.0490	0.0490 14.1652
00			18.1458	18.1458
×ON			3.4164 37.5037 18.1458	3.4164 37.5037 18.1458
ROG			3.4164	3.4164
	Category	Fugitive Dust	Off-Road	Total

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Brawley Solar Energy Facility - Imperial County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Cleanup - 2022 Unmitigated Construction Off-Site

CO2e		0.0000	155.7798	1,134.671 2	1,290.451 0
N20		0.0000 0.0000 0.0000 0.0000	0.0209	0.0457	0.0666
CH4	ay	0.000.0	7.8000e- 004	0.0555	0.0563
Total CO2	lb/day	0.0000	149.5357 149.5357 7.8000e- 004	1,119.657 1,119.657 3	1,269.193 1,269.193
Bio- CO2 NBio- CO2 Total CO2		0.0000	149.5357	1,119.657 3	1,269.193 1
Bio- CO2			i i i i		
PM2.5 Total		0.0000	0.4302	13.8780	14.3082
Exhaust PM2.5		0.0000	3.9200e- 003	6.8800e- 003	0.0108
Fugitive PM2.5		0.0000	0.4263	13.8711	14.2974
PM10 Total		0.0000	4.2065	137.5822 7.4700e- 137.5897 003	141.7962
Exhaust PM10	lb/day	0.0000	4.1000e- 003	7.4700e- 003	0.0116
Fugitive PM10	/qı	0.0000	024	137.5822	0.0124 141.7846
802		0.0000	3 1.4200e- 4.2 003	0.0110	
00		0.0000	0.3181 0.1303	5.1442	5.2745
×ON		0.0000	0.3181	0.5142	0.8323
ROG		0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	0.0153	0.8050	0.8203
	Category	Hauling	Vendor	Worker	Total

Mitigated Construction On-Site

CO2e		0.0000	4,788.844 8	4,788.844 8
N20				
CH4	ay		1.5364	1.5364
Total CO2	lb/day	0.000.0	4,750.435 1	4,750.435
PM2.5 Bio-CO2 NBio-CO2 Total CO2			0.0000 4,750.435 4,750.435 1.5364	0.0000 4,750.435 4,750.435 1.5364
Bio- CO2			•	
PM2.5 Total		3.0823	1.4281	4.5104
Exhaust PM2.5		0.000.0	1.4281	1.4281
Fugitive PM2.5		3.0823 0.0000		3.0823
PM10 Total		0.0000 6.3743	1.5523	7.9266
Exhaust PM10	day	0.000	1.5523	1.5523
Fugitive PM10	lb/day	6.3743		6.3743
S02			0.0490	0.0490
00			3.4164 37.5037 18.1458 0.0490	3.4164 37.5037 18.1458 0.0490
XON			37.5037	37.5037
ROG			3.4164	3.4164
	Category	Fugitive Dust	Off-Road	Total

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Brawley Solar Energy Facility - Imperial County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site 3.3 Site Cleanup - 2022

				·_	_
CO2e		0.0000	155.7798	1,134.671 2	1,290.451 0
N20		0.0000	0.0209	0.0457	0.0666
CH4	ay	0.000.0	7.8000e- 004	0.0555	0.0563
Total CO2	lb/day	0.000.0	149.5357	1,119.657 3	1,269.193 1
Bio- CO2 NBio- CO2 Total CO2		0.0000 0.0000 0.0000 0.0000	149.5357 149.5357 7.8000e- 004	1,119.657 1,119.657 3 3	1,269.193
Bio- CO2					
PM2.5 Total		0.0000	0.1644	5.1559	5.3203
Exhaust PM2.5			3.9200e- C 003	6.8800e- 003	0.0108
Fugitive PM2.5		0.000.0	0.1604	5.1491	5.3095
PM10 Total		0.0000 0.0000 0.0000	1.5480	50.3689	51.9169
Exhaust PM10	lay	0.0000	4.1000e- 003	7.4700e- 003	0.0116
Fugitive PM10	lb/day	0.0000		50.3614	51.9053
SO2		0.0000	1.4200e- 003	5.1442 0.0110 50.3614	0.0124 51.9053
00		0.0000			5.2745
×ON		0.0000 0.0000 0.0000 0.0000	0.0153 0.3181	0.8050 0.5142	0.8323
ROG		0.0000	0.0153	0.8050	0.8203
	Category	Hauling	Vendor	Worker	Total

3.4 PV System Installation - 2022 **Unmitigated Construction On-Site**

CO2e		3,907.143 9	3,907.143 9
N2O			.,
CH4	ay	0.9449	0.9449
Bio- CO2 NBio- CO2 Total CO2	lb/day	3,883.521 3,883.521 0.9449 5 5	3,883.521 3,883.521 5 5
NBio- CO2		3,883.521 5	3,883.521 5
Bio- CO2		1-8-8-8-8	
PM2.5 Total		1.0691	1.0691
Exhaust PM2.5		1.0691 1.0691	1.0691
Fugitive PM2.5			
PM10 Total		1.1342	1.1342
Exhaust PM10	b/day	1.1342	1.1342
Fugitive PM10	/qı		
802		0.0408	0.0408
00		23.0984	23.0984
NOX		23.3215	2.4707 23.3215 23.0984 0.0408
ROG		2.4707 23.3215 23.0984 0.0408	2.4707
	Category	Off-Road	Total

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Brawley Solar Energy Facility - Imperial County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 PV System Installation - 2022

Unmitigated Construction Off-Site

		_			
CO2e		0.0000	7,788.989 4	1,134.671 2	1.0901 8,923.660 6
N20		0.0000	1.0444	0.0457	1.0901
CH4	ay	0.000.0	0.0390	0.0555	0.0945
Total CO2	lb/day	0.000.0	7,476.787 0	1,119.657 3	8,596.444 3
Bio- CO2 NBio- CO2 Total CO2		0.0000 0.0000 0.0000 0.0000	7,476.787 7,476.787 0 0	1,119.657 1,119.657 3	8,596.444 8,596.444 0.0945 3
Bio- CO2					
PM2.5 Total		0.0000	21.5097	13.8780	35.3878
Exhaust PM2.5			0.1960	6.8800e- 003	0.2029
Fugitive PM2.5		0.0000 0.0000 0.0000	21.3137 0.1960	13.8711 6.8800e- 003	35.1849
PM10 Total		0.0000	210.3231	137.5897	0.2124 347.9128 35.1849
Exhaust PM10	lay	0.0000	0.2049	7.4700e- 003	0.2124
Fugitive PM10	lb/day	0.0000	210.1182	137.5822	347.7005
802		0.0000	0.0711	5.1442 0.0110 137.5822	0.0821
00		0.000.0	6.5145	5.1442	11.6587
×ON		0.0000 0.0000 0.0000 0.0000	15.9057 6.5145 0.0711 210.1182	0.5142	1.5722 16.4199 11.6587 0.0821 347.7005
ROG		0.0000	0.7672	0.8050	1.5722
	Category	Hauling	Vendor	Worker	Total

Mitigated Construction On-Site

CO2e		3,907.143 9	3,907.143 9
N20			
CH4	lb/day	0.9449	0.9449
Total CO2		3,883.521 5	3,883.521 5
Bio- CO2 NBio- CO2 Total CO2		0.0000 3,883.521 3,883.521 0.9449	0.0000 3,883.521 3,883.521 0.9449 5 5
Bio- CO2		0.0000	
PM2.5 Total		1.0691 1.0691	1.0691
Exhaust PM2.5		1.0691	1.0691
Fugitive PM2.5			
PM10 Total		1.1342 1.1342	1.1342
Exhaust PM10	lb/day	1.1342	1.1342
Fugitive PM10	/qı		
S02		0.0408	0.0408
00		23.0984	23.0984
XON		2.4707 23.3215 23.0984 0.0408	2.4707 23.3215 23.0984 0.0408
ROG		2.4707	2.4707
	Category	Off-Road	Total

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Brawley Solar Energy Facility - Imperial County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 PV System Installation - 2022

Mitigated Construction Off-Site

CO2e		0.0000	7,788.989 4	1,134.671 2	8,923.660 6				
N20		0.0000	1.0444	0.0457	1.0901				
CH4	ay	0.000.0	0.0390	0.0555	0.0945				
Total CO2	lb/day	0.0000 0.0000 0.0000	7,476.787 0	1,119.657 3	8,596.444 3				
Bio- CO2 NBio- CO2 Total CO2	lb/day					0.0000	7,476.787 7,476.787 0 0	1,119.657 1,119.657 3	8,596.444 8,596.444 3 3
Bio- CO2			 ! ! !						
PM2.5 Total		0.0000	8.2175	5.1559	13.3735				
Exhaust PM2.5		0.000.0	0.1960	6.8800e- 003	0.2029				
Fugitive PM2.5			0.000.0	8.0215	5.1491	13.1706			
PM10 Total		0.0000 0.0000 0.0000	77.4010	50.3689	127.7698				
Exhaust PM10		lb/day	lb/day	ʻday	0.0000	0.2049	7.4700e- 003	0.2124	
Fugitive PM10				0.0000	77.1961	50.3614	127.5575		
S02		0.000.0	0.0711 77.1961	0.0110	0.0821				
00		0.000.0	6.5145	5.1442	11.6587				
NOX		0.0000	0.7672 15.9057 6.5145	0.5142	1.5722 16.4199 11.6587 0.0821 127.5575				
ROG		0.0000 0.0000 0.0000 0.0000	0.7672	0.8050	1.5722				
	Category	Hauling	Vendor	Worker	Total				

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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Brawley Solar Energy Facility - Imperial County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

CO2e		219.1206	219.1206	
N20		215.1702 215.1702 0.0131 0.0122 219.1206	215.1702 215.1702 0.0131 0.0122 219.1206	
CH4	lb/day	day	0.0131	0.0131
Total CO2		215.1702	215.1702	
Bio- CO2 NBio- CO2 Total CO2		215.1702	215.1702 215.17	
Bio- CO2		1-0-0-0-0		
PM2.5 Total	lb/day	0.2718	0.2718	
Exhaust PM2.5		1.8100e- 003	1.9200e- 2.3478 0.2700 1.8100e- 0.2718 003 003	
Fugitive PM2.5		0.2700	0.2700	
PM10 Total		2.3478	2.3478	
Exhaust PM10		1.9200e- 003	1.9200e- 003	
Fugitive PM10		ep/ql	2.3458	2.3458
SO2		2.1100e- 003	2.1100e- 003	
00		1.0443	1.0443	
XON		0.1808	0.1808	
ROG		0.1121 0.1808 1.0443 2.1100e- 2.3458 1.9200e- 2.3478 0.2700 1.8100e- 0.2718 0.2718	0.1121 0.1808 1.0443 2.1100e- 2.3458 003	
	Category	Mitigated	Unmitigated	

4.2 Trip Summary Information

	Aver	Average Daily Trip Rate	ate	Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Manufacturing	0.00	00.00	00.00		
Other Non-Asphalt Surfaces	00.00	00.00	0.00		
Other Non-Asphalt Surfaces		00.00	00.00		
Refrigerated Warehouse-No Rail		40.32	00.00	14,869	14,869
Total	0.00	40.32	0.00	14,869	14,869

4.3 Trip Type Information

		Miles			Trip %			Trip Purpose %	% e
Land Use	H-W or C-W	H-S or C-C	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	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Manufacturing	02.9	5.00	8.90	29.00	28.00	13.00	92	2	3
Other Non-Asphalt Surfaces 6.70	6.70	5.00	8.90	00:0	00.00	0.00	0	0	0
Other Non-Asphalt Surfaces 6.70	6.70	5.00	8.90	00:0	00.00	0.00	0	0	0
Refrigerated Warehouse-No 6.70	6.70	5.00	8.90	29.00	0.00	41.00	92	5	က

4.4 Fleet Mix

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Brawley Solar Energy Facility - Imperial County, Winter

EMFAC	Off-Mode	EMFAC Off-Model Adjustment Factors for G	ent Factors	s for Gaso	line Light	3asoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied	icle to Acc	ount for tl	he SAFE ∖	ehicle Ru	le Applied		
Land Use	LDA	LDA LDT1 LDT2	LDT2	MDV	LHD1	LHD1 LHD2	MHD		OBUS	HHD OBUS UBUS MCY	MCY	SBUS	MH
Manufacturing	0.516491	0.516491 0.059473 0.180350 0.154783 0.028319 0.006956 0.008567 0.016600 0.000919 0.000123 0.022855 0.000793 0.003771	0.180350	0.154783	0.028319	0.006956	0.008567	0.016600	0.000919	0.000123	0.022855	0.000793	0.003771
Other Non-Asphalt Surfaces 0.516491 0.059473 0.180350 0.154783 0.028319 0.006956 0.008567 0.016600 0.000919 0.000123 0.022855 0.000793 0.003771	0.516491	0.516491 0.059473	0.180350	0.154783	0.028319	0.006956	0.008567 0	0.016600 0	0.000919	0.000123	0.022855	0.000793	0.003771
Refrigerated Warehouse-No Rail 0.516491 0.059473 0.180350 0.154783 0.028319 0.006956 0.008567 0.016600 0.000919 0.000123 0.022855 0.000793 0.003771	0.516491	0.059473	0.180350	0.154783	0.028319	783 0.028319 0.006956 0.008567 0.016600 0.000919 0.000123 0.022855	0.008567	0.016600	0.000919	0.000123	0.022855	0.000793	0.003771

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Kilowatt Hours of Renewable Electricity Generated

CO2e		0.0000	0.0000		
NZO		0.0000 0.0000 0.0000 0.0000			
CH4	lb/day	ay	0.0000	0.0000 0.0000 0.0000	
Total CO2	p/ql	0.0000	0.0000		
NBio- CO2		0.0000	0.0000		
Bio- CO2 NBio- CO2 Total CO2					
PM2.5 Total	lb/day	0.0000	0.0000		
Exhaust PM2.5			0.0000		
Fugitive PM2.5					
PM10 Total				0.0000	0.0000
Exhaust PM10		0.000.0	0.0000		
Fugitive PM10					
SO2		0.0000	0.0000		
00		0.0000	0.0000		
×ON		0.0000	0.0000		
ROG		0.0000 0.0000 0.0000	0.0000 0.0000 0.0000		
	Category	NaturalGas Mitigated	: · · · ·		

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Brawley Solar Energy Facility - Imperial County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

CO2e		0.0000	0.0000	0.0000	0.0000															
NZO	lay		0.0000	0.0000	0.0000	0.0000														
CH4		0.0000	0.0000	0.0000	0.0000															
Total CO2	lb/day	0.0000	0.0000	0.0000	0.0000															
Bio- CO2 NBio- CO2 Total CO2		0.0000	0.000.0	0.000.0	0.0000															
Bio- CO2																				
PM2.5 Total	lb/day	0.0000	0.0000	0.0000	0.0000															
Exhaust PM2.5		lb/day	lb/day	day	/day												0.0000	0.0000	0.0000	0.000
Fugitive PM2.5																				
PM10 Total												0.000.0	0.0000	0.000.0	0.000					
Exhaust PM10						0.000.0	0.0000	0.0000	0.0000											
Fugitive PM10																				
SO2		0.0000	0.0000	0.0000	0.0000															
00		0.0000	0.0000	0.0000	0.000 0.0000															
NOx		0.0000 0.0000 0.0000	0.0000 0.0000	0.0000	0.0000															
ROG		0.0000	0.0000	0.0000	0.000															
NaturalGa s Use	kBTU/yr	0	0	0																
	Land Use	Manufacturing	Other Non- Asphalt Surfaces	Refrigerated Warehouse-No Rail	Total															

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Brawley Solar Energy Facility - Imperial County, Winter

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Mitigated

C02e		0.0000	•	0.0000	0.0000													
N2O		0.0000	0.0000	0.0000	0.0000													
CH4	ay	0.0000	0.0000	0.0000	0.0000													
Total CO2	lb/day lb/day	0.0000 0.0000 0.0000 0.0000	0.0000	0.000.0	0.000													
Bio- CO2 NBio- CO2 Total CO2		0.0000	0.0000	0.000.0	0.0000													
Bio- CO2																		
PM2.5 Total		0.0000	0.0000	0.0000	0.0000													
Exhaust PM2.5		lb/day	lb/day	lb/day		0.0000	0.0000	0.0000										
Fugitive PM2.5					day													
PM10 Total						0.0000 0.0000	0.000.0	0.0000	0.000.0									
Exhaust PM10						0.0000	0.0000	0.0000	0.000									
Fugitive PM10																		
S02					0.0000	0.0000	0.0000	0000'0										
00		0.0000	0.0000 0.0000	0.0000	0.000													
×ON				0.0000 0.0000 0.0000	0.0000	0.000.0	0.0000 0.0000 0.0000 0.0000											
ROG			0.0000	0.0000	0.0000													
NaturalGa s Use	kBTU/yr		0	0														
	Land Use	Manufacturing 0	Other Non- Asphalt Surfaces	Refrigerated Warehouse-No Rail	Total													

6.0 Area Detail

6.1 Mitigation Measures Area

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Brawley Solar Energy Facility - Imperial County, Winter

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C02e		0.0901	0.0901
N20			
CH4	я̀у	2.2000e- 004	2.2000e- 004
Total CO2	lb/day	0.0845	0.0845
Bio- CO2 NBio- CO2 Total CO2		0.0845	0.0845
Bio- CO2			
PM2.5 Total		1.4000e- 004	1.4000e- 004
Exhaust PM2.5		1.4000e- 1.4000e- 004 004	1.4000e- 1.4000e- 004 004
Fugitive PM2.5			
PM10 Total		1.4000e- 004	.4000e- 1.4000e- 004 004
Exhaust PM10	day	1.4000e- 1.4000e- 004 004	1.4000e- 004
Fugitive PM10	lb/day		
802		0.000	0.0000
00		0.0395	0.0395
×ON		5.3456 3.6000e- 0.0395 0.0000 004	5.3456 3.6000e- 0.0395 0.0000 004
ROG		5.3456	5.3456
	Category	Mitigated	Unmitigated

6.2 Area by SubCategory

Unmitigated

			•	•	
C02e		0.0000	0.0000	0.0901	0.0901
NZO					
CH4	lb/day			2.2000e- 004	2.2000e- 004
Total CO2)/qI	0.0000	0.0000	0.0845	0.0845
Bio- CO2 NBio- CO2 Total CO2			 	0.0845	0.0845
Bio- CO2					
PM2.5 Total		0.0000	0.0000	1.4000e- 004	1.4000e- 004
Exhaust PM2.5			0.0000	1.4000e- 004	1.4000e- 004
Fugitive PM2.5					
PM10 Total		0.0000	0.000	1.4000e- 004	1.4000e- 004
Exhaust PM10	day	0.0000	0.0000	1.4000e- 004	1.4000e- 004
Fugitive PM10	lb/day				
S02				0.0000	0.000.0
00				0.0395	0.0395
NOx			 	3.6000e- 004	5.3456 3.6000e- 0.0395 004
ROG		1.7440	3.5979	3.6700e- 003	5.3456
	SubCategory		Consumer Products	Landscaping	Total

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Brawley Solar Energy Facility - Imperial County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Mitigated

CO2e		000	000	901	901
00		0.0000	0.0000	0.0901	0.0901
N20					
CH4	lay			2.2000e- 004	2.2000e- 004
Total CO2	lb/day	0.0000	0.0000	0.0845	0.0845
Bio- CO2 NBio- CO2 Total CO2				0.0845	0.0845
Bio- CO2			i i i i	i i i i	
PM2.5 Total		0.0000	0.0000	1.4000e- 004	1.4000e- 004
Exhaust PM2.5		0.0000	0.0000	1.4000e- 004	1.4000e- 004
Fugitive PM2.5					
PM10 Total		0.0000	0.000	1.4000e- 004	1.4000e- 004
Exhaust PM10	day	0.0000	0.0000	1.4000e- 004	1.4000e- 004
Fugitive PM10	lb/day				
805			-	0.0000	0.0000
00				0.0395	0.0395
XON				3.6700e- 3.6000e- 003 004	3.6000e- 004
ROG		1.7440	3.5979	3.6700e- 003	5.3456
	SubCategory	Architectural Coating		Landscaping	Total

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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Brawley Solar Energy Facility - Imperial County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type
Emergency Generator	1	0.5	26	62	0.73	0.73 Diesel

	Fuel Type
	Boiler Rating
	Heat Input/Year
	Heat Input/Day
	Number
Boilers	Equipment Type

User Defined Equipment

Number	
Equipment Type	

10.1 Stationary Sources

Unmitigated/Mitigated

				I	I											
	ROG	NOx	00	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	NBio- CO2 Total CO2	CH4	N20	CO2e
Equipment Type					lb/day	ay							lb/day	ау		
Emergency Generator - Diesel (50 - 75 HP)	0.0509	0.1659	0.1659 0.1846 2.4000e-	2.4000e- 004		7.4800e- 003	7.4800e- 003		7.4800e- 003	7.4800e- 003		26.0249	26.0249	3.6500e- 003		26.1162
Total	0.0509	0.1659	0.1846	2.4000e- 004		7.4800e- 003	7.4800e- 003		7.4800e- 003	7.4800e- 003		26.0249	26.0249	3.6500e- 003		26.1162

11.0 Vegetation

APPENDIX B

EMFAC2017 Model Printouts

EMFAC2017 (v1.0.2) Emissions Inventory

Region Type: County Region: IMPERIAL

Calendar Year: 2021

Season: Annual

Vehicle Classification: EMFAC2007 Categories

Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption. Note 'day' in the unit is operation day.

Fuel Consumption	13	38	73	31	81	52	54	22	32	37)3	81)3
Fuel Con	0.033	186.688	24.0077	80.6303	13.5471	2.54775	1.50285	82.9902	1.43468	5.52248	1.35289	0.1877	0.24169
Trips	56.52785	683437.9	77482.43	240462.6	63766.77	10488.4	13244.42	205347.3	85.975 1.434682	10123.01	2647.116	123.372	33.13188
	2.825263 137.49617 56.52785 0.03343	145175.9 5643786.6 683437.9 186.6888	17276.41 612064.25 77482.43 24.00773	1908388.1 240462.6 80.63031	144693.38 63766.77 13.54718	23736.979 10488.4 2.547752	59214.749 13244.42 1.502854	1607774.8 205347.3 82.99022	7399.0473	28400.557 10123.01 5.522487	6896.0896 2647.116 1.352893	1760.5474 123.372 0.187748	947.79829 33.13188 0.241693
Population VMT	2.825263	145175.9	17276.41	52024.47	4280.077	703.9896	6622.21	45128.95	859.4062	505.9482	132.3029	30.84301	8.282969
Calendar Y. Vehicle Cat Model Yea Speed Fuel	Aggregater Aggregater GAS	Aggregater Aggregater GAS	Aggregater Aggregater GAS	Aggregater Aggregater GAS	Aggregater Aggregater GAS	Aggregater Aggregater GAS	Aggregater Aggregater GAS	Aggregater Aggregater GAS	Aggregater Aggregater GAS	Aggregater Aggregater GAS	Aggregater Aggregater GAS	Aggregater Aggregater GAS	Aggregater Aggregater GAS
Calendar Y Vehicle (2021 HHDT	2021 LDA	2021 LDT1	2021 LDT2	2021 LHDT1	2021 LHDT2	2021 MCY	2021 MDV	2021 MH	2021 MHDT	2021 OBUS	2021 SBUS	2021 UBUS
Region	IMPERIAL	IMPERIAL	IMPERIAL	IMPERIAL	IMPERIAL	IMPERIAL	IMPERIAL	IMPERIAL	IMPERIAL	IMPERIAL	IMPERIAL	IMPERIAL	IMPERIAL

401 1,000 gall per day 400,688 gallons per day vehicle miles per day (All Categories) 10045200

Fleet Avg Miles per gallon 25.1

EMFAC2017 (v1.0.2) Emissions Inventory

Region Type: County

Region: IMPERIAL

Calendar Year: 2021

Season: Annual

Vehicle Classification: EMFAC2007 Categories

Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption. Note 'day' in the unit is operation day.

Region	Calendar Y Vehicle (Calendar Y Vehicle Cat Model Yea Speed Fuel	el Population VMT		Trips	Fuel Consumption
IMPERIAL	2021 HHDT	Aggregater Aggregated DSL		4859.163 727200.53 57864.68 102.13909	57864.68	102.13909
IMPERIAL	2021 LDA	Aggregater Aggregated DSL	1274.529		6002.429	50425.669 6002.429 0.9672779
IMPERIAL	2021 LDT1	Aggregater Aggregated DSL	13.16284	292.61362	42.55079	292.61362 42.55079 0.0113065
IMPERIAL	2021 LDT2	Aggregater Aggregated DSL	259.9127	11016.192	1284.794	11016.192 1284.794 0.2840536
IMPERIAL	2021 LHDT1	Aggregater Aggregated DSL	4178.056	148628.22 52554.68 7.1691825	52554.68	7.1691825
IMPERIAL	2021 LHDT2	Aggregater Aggregated DSL	1332.595	49408.266	16762.37	49408.266 16762.37 2.5735426
IMPERIAL	2021 MDV	Aggregater Aggregated DSL	896.497	36985.877	4343.927	1.2992358
IMPERIAL	2021 MH	Aggregater Aggregated DSL	- 282.4584	2576.735	2576.735 28.24584	0.2323685
IMPERIAL	2021 MHDT	Aggregater Aggregated DSL	2054.337	118673.4	15348.12	118673.4 15348.12 11.096555
IMPERIAL	2021 OBUS	Aggregater Aggregated DSL	135.3162	9408.1492	1254.028	9408.1492 1254.028 1.0144107
IMPERIAL	2021 SBUS	Aggregater Aggregated DSL	- 203.9511	6376.6912	2353.568	6376.6912 2353.568 0.8660474
IMPERIAL	2021 UBUS	Aggregater Aggregated DSL	27.95502		111.8201	3506.4503 111.8201 0.5197596

115 1,000 gall per day 882,860 Diesel Truck (HHDT, MDV, MHDT) vehicle miles per day

114,535 gallons per day

Diesel Truck Fleet Avg Miles per gallon 7.7

APPENDIX C

CalEEMod Model Annual Printouts

Brawley Solar Energy Facility - Imperial County, Annual

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Brawley Solar Energy Facility

Imperial County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Manufacturing	52.27	1000sqft	1.20		0
Refrigerated Warehouse-No Rail	100.80	1000sqft	ı	:	0
Other Non-Asphalt Surfaces	9.70	Acre	9.70	422,532.00	0
Other Non-Asphalt Surfaces	223.49	Acre 223.49 9,735,224.40	223.49	9,735,224.40	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	3.4	Precipitation Freq (Days)	12
Climate Zone	15			Operational Year	2022
Utility Company	Imperial Irrigation District				
CO2 Intensity (Ib/MWhr)	189.98	CH4 Intensity (Ib/MWhr)	0.033	N2O Intensity (Ib/MWhr)	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Total Project Site = 227 acres. Total Offsite Power Lines = 9.7 acres

Construction Phase - Construction schedule provided by applicant

Off-road Equipment - PV System Installation: 2 Aerial Lifts, 1 Air Compressor, 2 Cranes, 3 Forklifts, 1 Generator Set, 1 Grader, 2 Off-Hwy Trucks, 3 Tractors-Loaders-Backhoes, 1 Welder Off-road Equipment - PV System Install: 2 Aerial Lifts, Air Compressor, 2 Cranes, 3 Forklifts, 1 Generator Set, 1 Grader, 2 Off-Hwy Trucks, 3 Tractors-Loaders-Backhoes, 1 Welder

Off-road Equipment - Site Cleanup: 2 Graders, 2 Rubber Tired Loaders, 2 Rubber Tired Dozers, and 2 Tractors-Loaders-Backhoes

Off-road Equipment - Site Preparation: 2 Bore-Drill Rigs, 2 Excavators, 3 Rubber Tired Dozers, and 4 Tractor-Loader-Backhoe

Trips and VMT - 6 vendor trips per day added to Site Prep and Site Cleanup to account for water truck emissions. All worker trips set to 240 per day

Brawley Solar Energy Facility - Imperial County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

On-road Fugitive Dust - 85% of trips on pavement. Per Rule ICAPCD Rule 805 F.1.c - Material Silt Content set to 3%

Grading - Total Acres Graded 227 acres (Site Preparation Phase)

Vehicle Trips - 40 daily trips on Saturdays.

Road Dust - 99% roads paved

Consumer Products - Consumer products set to zero, since no workers will typical be onsite

Energy Use - No natural gas will be used onsite. Electricity use set to 1,946,667 per year.

Water And Wastewater - The project will use 0.81 acre feet or 263,939 gallons per year.

Solid Waste - Operation of the project will not generate solid waste

Construction Off-road Equipment Mitigation - Water Exposed Area 2x per day selected to account for ICAPCD Rule 801. Unpaved Road Moisture Content 7% selected to account for ICAPCD Rule 805 F.1.d. Unpaved Road vehicle speed set to 15 mph per PDF 3.

Energy Mitigation - Solar panels will generate 51,840,000 kWh-year

Stationary Sources - Emergency Generators and Fire Pumps - Emergency diesel generator - 62 hp, 0.73 load factor, 0.5 hour per day 26 hour per year

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	7
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	4,650.00	21.00
tblConstructionPhase	NumDays	465.00	129.00
tblConstructionPhase	NumDays	180.00	23.00
tblConsumerProducts	ROG_EF	2.14E-05	0
tblEnergyUse	LightingElect	2.93	0.00
tblEnergyUse	LightingElect	2.37	0.00
tblEnergyUse	NT24E	5.02	0.00
tblEnergyUse	NT24E	36.52	0.00
tblEnergyUse	NT24NG	17.13	0.00
tblEnergyUse	NT24NG	48.51	0.00
tblEnergyUse	T24E	1.97	0.00
tblEnergyUse	T24E	0.95	19.31
tblEnergyUse	T24NG	15.20	0.00
tblEnergyUse	T24NG	3.22	0.00

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• • • •	1.00	1.00	oadEquipmentUnitAmount 1.00 2.00	UsageHours 7.00 8.00	8.50	8.50	MaterialSiltContent 8.50 3.00	lorPercentPave 50.00	50.00	50.00	50.00	50.00	50.00	50	64.81	94.75	0.00	0.00	00.00	0.00	0.00	0.00	1,690.00	28.00	20.00	mber 4,331.00	ST_TR 6.42 0.00
AcresOfGrading	OffRoadEquipmentUnitAmount	OffRoadEquipmentUnitAmount	OffRoadEquipmentUnitAmount	UsageHours	MaterialSiltContent	MaterialSlitContent	MaterialSiltContent	VendorPercentPave	VendorPercentPave	VendorPercentPave	WorkerPercentPave	WorkerPercentPave	WorkerPercentPave	RoadPercentPave	SolidWasteGenerationRate	SolidWasteGenerationRate	HorsePowerValue	HoursPerDay	HoursPerYear	NumberOfEquipment	VendorTripNumber	VendorTripNumber	VendorTripNumber	WorkerTripNumber	WorkerTripNumber	WorkerTripNumber	ST_TR
tblGrading	tblOffRoadEquipment	tblOffRoadEquipment	tblOffRoadEquipment	tblOffRoadEquipment	tblOnRoadDust	tblOnRoadDust	tblOnRoadDust	tblOnRoadDust	tblOnRoadDust	tblOnRoadDust	tblOnRoadDust	tblOnRoadDust	tblOnRoadDust	tblRoadDust	tblSolidWaste	tblSolidWaste	tblStationaryGeneratorsPumpsUse	tblStationaryGeneratorsPumpsUse	tblStationaryGeneratorsPumpsUse	tblStationaryGeneratorsPumpsUse	tblTripsAndVMT	tblTripsAndVMT	tblTripsAndVMT	tblTripsAndVMT	tblTripsAndVMT	tblTripsAndVMT	tblVehicleTrips

Brawley Solar Energy Facility - Imperial County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.0 Emissions Summary

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.1 Overall Construction Unmitigated Construction

CO2e		1663	483.3328	483.3328
ŏ		83.	483	
N20		7.4000e 004	0.0142	0.0142
CH4	Уr	0.0226 7.4000e- 83.1663 004	0.1029	0.1029
Total CO2	MT/yr	82.3825	476.5250	476.5250
NBio- CO2 Total CO2		0.0000 82.3825	0.0000 476.5250 476.5250 0.1029	0.0000 476.5250
Bio- CO2		0.000.0	0.000	0.000.0
PM2.5 Total		0.3123	1.7980	1.7980
Exhaust PM2.5			0.1062	0.1062
Fugitive PM2.5		0.2863	1.6918	1.6918
PM10 Total		1.9336	0.1150 13.4069	13.4069
Exhaust PM10	tons/yr	0.0282	0.1150	0.1150
Fugitive PM10	tons	1.9054	13.2919	13.2919
802		0.0673 0.5957 0.4398 9.3000e- 1.9054	2.8858 1.9135 5.3100e- 13.2919 003	1.9135 5.3100e- 13.2919 003
00		0.4398	1.9135	1.9135
×ON		0.5957	2.8858	2.8858
ROG		0.0673	0.3224	0.3224
	Year	2021	2022	Maximum

Mitigated Construction

CO2e		83.1662	483.3324	483.3324
N20		0.0226 7.4000e- 83.1662 004	0.0142	0.0142
CH4	'yr	0.0226	0.1029	0.1029
Total CO2	MT/yr	82.3824	476.5247	476.5247
Bio- CO2 NBio- CO2 Total CO2		0.0000 82.3824 82.3824	476.5247 476.5247	0.0000 476.5247
Bio- CO2		0.0000	0.0000	0.000.0
PM2.5 Total		0.1423	0.7708	0.7708
Exhaust PM2.5		0.0259	0.1062	0.1062
Fugitive PM2.5		0.1164 0.0259	0.6646	0.6646
PM10 Total		0.7535	5.0623	5.0623
Exhaust PM10	s/yr	0.0282	0.1150	0.1150
Fugitive PM10	tons/yr	0.7253	4.9473	4.9473
SO2		9.3000e- 004	5.3100e- 003	5.3100e- 4.3 003
00		0.4398	1.9135	1.9135
×ON		0.5957	2.8858	2.8858 1.9135
ROG		0.0673	0.3224	0.3224
	Year	2021	2022	Maximum

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

C02e	0.00			
ပ	Ö			
N20	0.00			
CH4	0.00	arter)		
Total CO2	0.00	X (tons/qua		
NBio-CO2	0.00	d ROG + NC	1.5345	
PM2.5 Bio- CO2 NBio-CO2 Total CO2 CH4 Total	0.00	Maximum Mitigated ROG + NOX (tons/quarter)		
PM2.5 Total	56.73	Maxim		
Fugitive Exhaust PM2.5 PM2.5	0.00	uarter)		
Fugitive PM2.5	60.52	Maximum Unmitigated ROG + NOX (tons/quarter)		
PM10 Total	62.09	ted ROG + P	1.5345	
Exhaust PM10	0.00	m Unmitigat		
Fugitive PM10	62.67	Maximu		
S02	0.00	End Date	2-28-2022	
00	0.00	End	2-28-	
XON	0.00	Start Date	12-1-2021	
ROG	0.00	Star	12-1	
	Percent Reduction	Quarter	-	

Maximum Mitigated ROG + NOX (tons/quarter)	1.5345	1.4049	0.9317	1.5345
Maximum Unmitigated ROG + NOX (tons/quarter)	1.5345	1.4049	0.9317	1.5345
End Date	2-28-2022	5-31-2022	8-31-2022	Highest
Start Date	12-1-2021	3-1-2022	6-1-2022	
Quarter	1	2	3	

2.2 Overall Operational **Unmitigated Operational**

CO2e		7.3600e- 003	169.5130	5.4382	0.6160	0.0000	0.6586	176.2331
N20		0.000	3.5300e- 003	2.8000e- 004	0.000	0.0000	2.1000e- 004	4.0200e- 003
CH4	/yr	2.0000e- 005	0.0291	2.9000e- 004	9.0000e- 005	0.0000	8.6500e- 003	0.0382
Total CO2	MT/yr	6.9000e- 003	167.7322	5.3467	0.6139	0.0000	0.3799	174.0796
NBio- CO2 Total CO2		6.9000e- 003	167.7322	5.3467	0.6139	0.0000	0.2962	173.9958
Bio- CO2		0.000.0	0.0000	0.000.0	0.0000	0.0000	0.0837	0.0837
PM2.5 Total		1.0000e- 005	0.0000	7.0600e- 003	1.9000e- 004	0.0000	0.0000	7.2600e- 003
Exhaust PM2.5		1.0000e- 005	0.0000	5.0000e- 005	1.9000e- 004	0.0000	0.0000	2.5000e- 004
Fugitive PM2.5			 	7.0100e- 003				7.0100e- 003
PM10 Total		1.0000e- 005	0.0000	0.0610	1.9000e- 004	0.0000	0.000	0.0612
Exhaust PM10	s/yr	1.0000e- 005	0.0000	5.0000e- 005	1.9000e- 004	0.0000	0.0000	2.5000e- 004
Fugitive PM10	tons/yr			0.0610				0.0610
SO2			0.0000	i	1.0000e- 005			7.0000e- 005
00		3.5500e- 003	0.0000	0.0287	4.8000e- 003			0.0370
XON		3.0000e- 005		.5800e- 003	.3100e- 003	[8.9200e- 003
ROG		0.9752	0.0000	3.4500e- 003	1.3200e- 4 003	- -		0.9800
	Category	Area	Energy	:	<u>.</u>	Waste	Water	Total

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Mitigated Operational

CO2e		7.3600e- 003	4,345.148 3	5.4382	0.6160	0.0000	0.6586	- 4,338.428 2
N2O		0.000.0	-0.0905	2.8000e- 004	0.000.0	0.0000	2.1000e- 004	0.0900
СН4	/yr	2.0000e- 005	-0.7468	2.9000e- 004	9.0000e- 005	0.0000	8.6500e- 003	-0.7378
Total CO2	MT/yr	6.9000e- 003	4,299.500	5.3467	0.6139	0.0000	0.3799	- 4,293.153 6
Bio- CO2 NBio- CO2 Total CO2		6.9000e- 003	4,299.500 4 9	5.3467	0.6139	0.0000	0.2962	- 4,293.237 3
Bio- CO2		0.000.0	0.0000	0.000.0	0.000.0	0.000.0	0.0837	0.0837
PM2.5 Total		1.0000e- 005	0.0000	7.0600e- 003	1.9000e- 004	0.0000	0.0000	7.2600e- 003
Exhaust PM2.5		1.0000e- 005	0.0000	5.0000e- 005	1.9000e- 004	0.0000	0.0000	2.5000e- 004
Fugitive PM2.5				7.0100e- 003				7.0100e- 003
PM10 Total		1.0000e- 005	0.0000	0.0610	1.9000e- 004	0.0000	0.0000	0.0612
Exhaust PM10	tons/yr	1.0000e- 005	0.0000	5.0000e- 005	1.9000e- 004	0.0000	0.0000	2.5000e- 004
Fugitive PM10	ton		<u>.</u>	0.0610				0.0610
SO2			0.0000	6.0000e- 005	1.0000e- 005			7.0000e- 005
00		3.0000e- 3.5500e- 005 003	0.0000	0.0287	4.8000e- 003			0.0370
NOX		3.0000e- 005	0.0000	.5800e- 003	4.3100e- 003			8.9200e- 003
ROG		0.9752	0.0000	3.4500e- 4. 003	1.3200e- 003			0086.0
	Category	Area	:	Mobile	Stationary	Waste	Water	Total

C02e	2,561.76
N20	2,339.80
СН4	2,031.87
Total CO2	2,566.20
Bio- CO2 NBio-CO2 Total CO2	2,567.44 2,566.20 2,031.87 2,339.80 2,561.76
Bio- CO2	00:0
PM2.5 Total	00'0
Exhaust PM2.5	00:0
Fugitive PM2.5	00:0
PM10 Total	00:0
Exhaust PM10	00'0
Fugitive PM10	00'0
S02	00'0
00	00'0
NOx	00:00
ROG	00'0
	Percent Reduction

3.0 Construction Detail

Construction Phase

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2	Site Cleanup	Grading	1/1/2022	6/30/2022	 5.	129
3	PV System Installation	Building Construction	7/1/2022	7/31/2022	5	3 PV System Installation Building Construction 7/1/2022 7/31/2022 5 21

Acres of Grading (Site Preparation Phase): 227

Acres of Grading (Grading Phase): 258

Acres of Paving: 233.19

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

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Bore/Drill Rigs	2	8.00	221	0.50
Site Preparation	Excavators	2	8.00	158	0.38
Site Preparation	Rubber Tired Dozers	e	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	26	0.37
Site Cleanup	Graders	2	8.00	187	0.41
Site Cleanup	Rubber Tired Dozers	2	8.00	247	0.40
Site Cleanup	Rubber Tired Loaders	2	8.00	203	0.36
Site Cleanup	Tractors/Loaders/Backhoes	2	8.00	26	0.37
PV System Installation	Aerial Lifts	2	8.00	63	0.31
PV System Installation	Air Compressors		8.00	82	0.48
PV System Installation	Cranes	2	8.00	231	0.29
PV System Installation	Forklifts	С	8.00	68	0.20
PV System Installation	Generator Sets	_	8.00	84	0.74
PV System Installation	Tractors/Loaders/Backhoes	С	7.00	26	0.37
PV System Installation	Welders	1	8.00	46	0.45

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase Name	Offroad Equipment Worker Trip Count Number	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	endor Trip Hauling Trip Worker Trip Number Length	Vendor Trip Length	Hauling Trip Length	Vendor Trip Hauling Trip Worker Vehicle Length Length Class	Vendor Vehicle Class	Vehicle Class Vehicle Class
Site Preparation		240.00	900.9	00:00	7.30	8.90		lix	Λix	ННОТ
Site Cleanup	ω	240.00				8.90			HDT_Mix	HHDT
PV System Installation	on 13	240.00	300.00	00:00	7.30	8.90		20.00 LD_Mix	HDT_Mix	ННОТ

3.1 Mitigation Measures Construction

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2021

Unmitigated Construction On-Site

CO2e		0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	68.4673	68.4673
N20		0.0000	0.0000	0.0000
CH4	/yr	0.0000	0.0220	0.0220
Total CO2	MT/yr	0.000.0	67.9181 0.0220	67.9181
NBio- CO2		0.0000	67.9181	67.9181
Bio- CO2 NBio- CO2 Total CO2		0.000.0	0.0000 67.9181	0.0000 67.9181
PM2.5 Total		0.1272	0.0258	0.1530
Exhaust PM2.5		0.3281 0.1272 0.0000 0.1272	0.0258	0.0258
Fugitive PM2.5		0.1272		0.1272
PM10 Total		0.3281	0.0280	0.3562
Exhaust PM10	tons/yr	0.000.0	0.0280	0.0280
Fugitive PM10	ton	0.3281		0.3281
S02			7.7000e- 004	7.7000e- 004
00			0.3662	0.3662
XON			0.0559 0.5848 0.3662 7.7000e-	0.0559 0.5848 0.3662 7.7000e- 0.3281
ROG			0.0559	0.0559
	Category	Fugitive Dust	Off-Road	Total

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3.2 Site Preparation - 2021 Unmitigated Construction Off-Site

		_			
CO2e		0.0000	1.6610	13.0380	14.6990
N20		0.0000 0.0000 0.0000 0.0000 0.0000	2.2000e- 004	5.1000e- 004	7.3000e- 004
CH4	/yr	0.000.0	1.0000e- 005	6.1000e- 5. 004	6.2000e- 004
Total CO2	MT/yr	0.000.0	1.5940	12.8704	14.4644
Bio- CO2 NBio- CO2 Total CO2		0.0000	1.5940	12.8704	14.4644
Bio- CO2			0.0000	0.0000	0.000.0
PM2.5 Total		0.0000	4.8200e- 003	0.1545	0.1593
Exhaust PM2.5		0.000.0	8.0000e- 005	9.0000e- 005	1.7000e- 004
Fugitive PM2.5		0.0000 0.0000 0.0000	4.7500e- 8.0000e- 003 005	0.1544	0.1591
PM10 Total		0.000.0	0.0468	1.5306	1.5775
Exhaust PM10	ons/yr	0.0000	8.0000e- 005	9.0000e- 005	1.7000e- 004
Fugitive PM10	tons	0.000.0	0.0468	1.5305	.5773
SO2		0.0000	2.0000e- 005	1.4000e- 004	1.6000e- 1 004
00		0.000.0	1.6700e- 003	719	0.0735
XON		0.0000 0.0000 0.0000 0.0000	2.3000e- 4.3500e- 1.6700e- 2.0000e- 004 003 003 005	6.5600e- 003	0.0109
ROG		0.0000	2.3000e- 004	0.0111 6.5600e- 0.07 003	0.0114
	Category	Hauling	<u> </u>	Worker	Total

Mitigated Construction On-Site

Bio- CO2 NBio- CO2 Total CO2 CH4 N2O CO2e	MT/yr	0.0572 0.0000 0.0000 0.0000 0.0000 0.0000	0 67.9180 0.0220 0.0000 68.4672	1 67 99 0000 0 0000 0 0870 29 0
		0.000 0.0000	0.0000 67.9180 67.9180	00000
Exhaust PM2.5 PM2.5 Total		.0000 0.0572	0.0258 0.0258	00000
Fugitive PM2.5		0.0572 0		0 05.20
Exhaust PM10 PM10	уг	0.0000 0.1477 0.0572 0.0000	0.0280 0.0280	0 0 0 0 0 1 7 5 7
Fugitive PM10	tons/yr	0.1477		7477
co soz			0.3662 7.7000e- 004	0.3662 7.70006- 0.1477
XON			0.5848 0.3662	0.5848
ROG			0.0559	0.0559
	Category	Fugitive Dust	Off-Road	Total

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Mitigated Construction Off-Site 3.2 Site Preparation - 2021

	ROG	×ON	00	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	Bio- CO2 NBio- CO2 Total CO2	Total CO2	CH4	N20	CO2e
Category					ton	tons/yr							MT/yr	'yr		
Hauling	0.0000	0.0000 0.0000 0.0000 0.0000	0.0000	0.0000		0.0000	0.0000	0.000.0	0.0000	00000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.3000e- 004	2.3000e- 4.3500e- 1.6700e- 2.0000e- 0.0172 004 003 005	1.6700e- 003	2.0000e- 005		8.0000e- 005	0.0173	1.7900e- 003	8.0000e- 005	8700e- 003	0.000.0	1.5940	1.5940	1.0000e- 2 005	2.2000e- 004	1.6610
Worker	0.0111	6.5600e- 003	0.0719	1.4000e- 004		9.0000e- 005	0.5606	0.0574	9.0000e- 005	0.0575	0.0000	12.8704	12.8704	6.1000e- 5 004	- 5.1000e- ′ 004	13.0380
Total	0.0114	0.0109	0.0735	0.0735 1.6000e-	0.5777	1.7000e- 004	0.5778	0.0592	1.7000e- 004	0.0593	0.000	14.4644	14.4644	6.2000e- 004	7.3000e- 1 004	14.6990

Unmitigated Construction On-Site 3.3 Site Cleanup - 2022

				_
CO2e		0.0000	280.211	280.211
N20		0.0000	0.0000 280.2117	0.0000 280.2117
CH4	/yr	0.000.0	0.0899	6680.0
Total CO2	MT/yr	0.0000	277.9642	277.9642
NBio- CO2		0.0000 0.0000 0.0000 0.0000 0.0000	0.0000 277.9642 277.9642 0.0899	0.0000 277.9642 277.9642
Bio- CO2 NBio- CO2 Total CO2 CH4		0.0000	0.0000	0.000.0
PM2.5 Total		0.4418	0.0921	0.5339
Exhaust PM2.5		0.0000 0.9137 0.4418 0.0000 0.4418	0.0921	0.0921
Fugitive PM2.5		0.4418		0.4418
PM10 Total		0.9137	0.1001	1.0138
Exhaust PM10	ons/yr	0.0000	0.1001	0.1001
Fugitive PM10	ton	0.9137		0.9137
805			3.1600e- 003	1.1704 3.1600e- 003
00			1.1704	1.1704
×ON			0.2204 2.4190 1.1704 3.1600e- 003	2.4190
ROG			0.2204	0.2204
	Category	Fugitive Dust	Off-Road	Total

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3.3 Site Cleanup - 2022

Unmitigated Construction Off-Site

Ф		8	, g	9	20
CO2e		0.0000	9.1088	71.0819	80.1907
NZO		0.0000 0.0000 0.0000 0.0000	. 1.2200e- 9 003	2.6300e- 7 003	3.8500e- 003
CH4	MT/yr	0.0000	5.0000e- 005	3.0600e- 003	3.1100e- 003
Total CO2	M	0.000.0	8.7440	70.2210	78.9650
NBio- CO2 Total CO2		0.0000	8.7440	70.2210	78.9650
Bio- CO2		0.0000	0.0000	0.0000	0.0000
PM2.5 Total		0.0000	0.0269	0.8663	0.8931
Exhaust PM2.5		0.000.0	2.5000e- 004	4.4000e- 004	6.9000e- 004
Fugitive PM2.5		0.0000	0.0266	0.8658	0.8924
PM10 Total		0.000.0	0.2625	8.5847	8.8472
Exhaust PM10	ons/yr	0.0000	2.6000e- 004	4.8000e- 004	7.4000e- 004
Fugitive PM10	ton	0.0000	0.2622	8.5842	8.8465
SO2		0.0000 0.0000 0.0000 0.0000	1.0000e- 0.0202 8.2300e- 9.0000e- 003 005	0.3658 7.6000e- 004	8.5000e- 004
00		0.0000	8.2300e- 003	0.3658	0.3740
NOX		0.0000	0.0202	0.0324	0.0526
ROG		0.0000	1.0000e- 003	0.0576	0.0586
	Category	Hauling	Vendor	Worker	Total

Mitigated Construction On-Site

<u>~</u>	ROG	XON	8	802	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Bio- CO2 NBio- CO2 Total CO2	CH4	NZO	CO2e
				-	tons/yr	s/yr							MT/yr	بذ		
					0.4111	0.0000	0.0000 0.4111 0.1988	0.1988	0.0000 0.1988	T	0.000.0	0.0000	0.0000 0.0000 0.0000 0.0000 0.0000	0.000.0	0.0000	0.0000
Off-Road 0.2	0.2204	2.4190	1.1704 3.1600e- 003	3.1600e- 003		0.1001	0.1001	 	0.0921	0.0921	0.000.0	277.9639 277.9	0.0000 277.9639 277.9639 0.0899	0.0899	0.0000	280.2113
0.2	0.2204	2.4190	1.1704	2.4190 1.1704 3.1600e-	0.4111	0.1001	0.5113	0.1988	0.0921	0.2909	0.0000	277.9639	0.0000 277.9639 277.9639	0.0899	0.0000	280.2113

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3.3 Site Cleanup - 2022
Mitigated Construction Off-Site

CO2e		000	988	71.0819	80.1907
8		0:00	9.1088	71.0	
N20		0.0000	1.2200e- 003	э- 2.6300e- 003	3.8500e- 003
CH4	MT/yr	0.0000	5.0000e- 1.2200e- 005 003	3.0600e- 003	3.1100e- 3 003
Total CO2	M	0.000.0	8.7440	70.2210	78.9650
Bio- CO2 NBio- CO2 Total CO2		0.0000	8.7440	70.2210	78.9650
Bio- CO2		0.0000 0.0000 0.0000 0.0000 0.0000	0.0000	0.0000	0.000.0
PM2.5 Total		0.0000	0.0103	0.3222	0.3325
Exhaust PM2.5		0.0000 0.0000 0.0000 0.0000	0 2.5000e- 0 004	4.4000e- 004	6.9000e- 004
Fugitive PM2.5		0.000.0	0.0100	0.3217	0.3318
PM10 Total		0.0000	0.0967	3.1439	3.2406
Exhaust PM10	s/yr	0.0000	2.6000e- 004	4.8000e- 004	7.4000e- 004
Fugitive PM10	tons/yr		I	3.1435	3.2398
S02		0.0000	9.0000e- 005	7.6000e- 004	8.5000e- 004
00		0.0000 0.0000 0.0000 0.0000	8.2300e- 003	0.0324 0.3658 7.6000e- 3	0.3740
NOx		0.0000	0.0202	0.0324	0.0526
ROG		0.0000	1.0000e- 0.0202 8.2300e- 9.0000e- 0.0964 003 005	0.0576	0.0586
	Category	Hauling	• • • • • !	Worker	Total

3.4 PV System Installation - 2022 Unmitigated Construction On-Site

CO2e		37.2173	37.2173
N2O		0.0000	0.0000
CH4	'yr	9.0000e- 003	9.0000e- 003
Total CO2	MT/yr	36.9923	36.9923
Bio- CO2 NBio- CO2 Total CO2		0.0000 36.9923 36.9923 9.0000e- 0.0000 37.2173 0.0000	36.9923
Bio- CO2		0.0000	0.000
PM2.5 Total		0.0112	0.0112
Exhaust PM2.5		0.0112	0.0112
Fugitive PM2.5			
PM10 Total		0.0119	0.0119
Exhaust PM10	ons/yr	0.0119	0.0119
Fugitive PM10	ton		
SO2		4.3000e- 004	4.3000e- 004
00		0.2425	0.2425 4.3000e-
×ON		0.2449	0.2449
ROG		0.0259 0.2449 0.2425 4.3000e-	0.0259
	Category	Off-Road	Total

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3.4 PV System Installation - 2022

Unmitigated Construction Off-Site

	ROG	XON	00	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	Bio- CO2 NBio- CO2 Total CO2	Total CO2	CH4	N20	CO2e
Category					tons/yr	s/yr							MT/yr	بذ		
Hauling	0.0000 0.0000 0.0000 0.0000 0.0000	0.0000	0.0000	0.0000		0.0000	0.000.0	0.0000	0.0000	0.0000 0.0000 0.0000 0.0000 0.0000	0.000.0	0.0000	0.000 0.0000 0.0000 0.0000	0.000.0	0.000.0	0.0000
Vendor	8.1200e- 0.1640 0.0670 7.5000e- 003 004	0.1640	0.0670	7.5000e- 004	2.1343	2.1500e- 003	2.1365	0.2166	2.0500e- 003	0.2187	0.000.0	71.1722	71.1722 3.8000e- 004	3.8000e- 004	e- 9.9300e- 003	74.1416
Worker	9.3700e- 003	3- 5.2800e- 0.0 003	0.0595	5 1.2000e- 1. 004	1.3974	8.0000e- 005	1.3975	0.1410	7.0000e- 005	0.1410	0.000.0	11.4313	11.4313 5.0000e- 004	5.0000e- 004	4.3000e- 1 004	11.5715
Total	0.0175	0.1693	0.1266	0.0175 0.1693 0.1266 8.7000e- 3.5318 004		2.2300e- 003	3.5340	0.3576	2.1200e- 003	0.3597	0.0000	82.6035	82.6035 8.8000e- 004	8.8000e- 004	0.0104	85.7131

Mitigated Construction On-Site

CO2e		37.2172	37.2172
N20		0.0000	0.000
CH4	yr	9.0000e- 003	2 9.0000e- 003
Total CO2	MT/yr	36.9922	36.9922
Bio- CO2 NBio- CO2 Total CO2		0.0000 36.9922 36.9922 9.0000e- 0.0000 37.2172 003	36.9922
Bio- CO2		0.0000	0.000
PM2.5 Total		0.0112	0.0112
Exhaust PM2.5		0.0112	0.0112
Fugitive PM2.5			
PM10 Total		0.0119	0.0119
Exhaust PM10	s/yr	0.0119	0.0119
Fugitive PM10	tons/yr		
S02		4.3000e- 004	4.3000e- 004
00		0.2425	0.2425
×ON		0.2449	0.0259 0.2449 0.2425 4.3000e-
ROG		0.0259 0.2449 0.2425 4.3000e-	0.0259
	Category	Off-Road	Total

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3.4 PV System Installation - 2022 Mitigated Construction Off-Site

2e		00	116	715	131	
CO2e		0.0000	74.1416	11.5715	85.7131	
N20		0.0000 0.0000	9.9300e- 003	4.3000e- 004	0.0104	
CH4	MT/yr	0.0000	2 3.8000e- 004	5.0000e- 4. 004	8.8000e- 004	
Total CO2	LM	0.0000	71.1722	11.4313	82.6035	
Bio- CO2 NBio- CO2 Total CO2		0.0000 0.00000	71.1722	11.4313	82.6035	
Bio- CO2		0.000.0	0.0000	0.0000	0.000.0	
PM2.5 Total		0.0000	0.0837	0.0525	0.1362	
Exhaust PM2.5		0.000.0	2.0500e- 003	7.0000e- 005	2.1200e- 003	
Fugitive PM2.5		0.0000	0.0817	0.0524	0.1340	
PM10 Total		0.0000	0.7867	0.5118	1.2985	
Exhaust PM10	s/yr	0.0000	2.1500e- 003	8.0000e- 005	2.2300e- 003	
Fugitive PM10	tons/	tons/yr	0.0000	0.7845	.5117	1.2963
S02		0.0000	5000e- 004	2000e- 004	8.7000e- 004	
00		0.0000	0.067	0.059	0.1266	
×ON		0.0000 0.0000 0.0000 0.0000	0.1640	5.2800e- 003	0.1693	
ROG		0.0000	8.1200e- 0.1640 003	9.3700e- 003	0.0175	
	Category	Hauling	Vendor	Worker	Total	

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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CO2e		5.4382	5.4382
N20		0.0000 5.3467 5.3467 2.9000e- 2.8000e- 0.004	0.0000 5.3467 5.3467 2.9000e- 2.8000e- 004 004
CH4	MT/yr	2.9000e- 004	2.9000e- 004
Bio- CO2 NBio- CO2 Total CO2	IM	5.3467	5.3467
NBio- CO2		5.3467	5.3467
Bio- CO2		0.0000	0.0000
PM2.5 Total		5.0000e- 0.0610 7.0100e- 5.0000e- 7.0600e- 005 005 003	5.0000e- 7.0600e- 005 003
Exhaust PM2.5		5.0000e- 005	5.0000e- 005
Fugitive PM2.5	tons/yr	7.0100e- 003	5.0000e- 0.0610 7.0100e- 005 003
PM10 Total		0.0610	0.0610
Exhaust PM10		s/yr	5.0000e- 005
Fugitive PM10	ton		
S02		6.0000e- 005	6.0000e- 005
00		0.0287	0.0287
XON		4.5800e- 003	4.5800e- 003
ROG		3.4500e- 4.5800e- 0.0287 6.0000e- 0.0610 003 003	3.4500e- 4.5800e- 0.0287 6.0000e- 0.0610 003 003
	Category	Mitigated	Unmitigated

4.2 Trip Summary Information

	Aver	Average Daily Trip Rate	ate	Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Manufacturing	0.00	00.00	00.00		
Other Non-Asphalt Surfaces	00.00	00.00	0.00		
Other Non-Asphalt Surfaces		00.00	00.00		
Refrigerated Warehouse-No Rail		40.32	00.00	14,869	14,869
Total	0.00	40.32	0.00	14,869	14,869

4.3 Trip Type Information

		Miles			Trip %			Trip Purpose %	% c
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-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
Manufacturing 6.70	6.70	5.00	8.90	29.00	28.00	13.00	92	2	င
Other Non-Asphalt Surfaces	6.70	5.00	8.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	6.70	5.00	8.90	0.00	0.00	0.00	0	0	0
Refrigerated Warehouse-No	6.70	5.00	8.90	59.00	00.00	41.00	92	5	က

4.4 Fleet Mix

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					i i	in the second							
Land Use	LDA	LDT1 LDT2	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	SNBN	MCY	SBUS	MH
Manufacturing	0.516491	0.059473	0	0.154783	0.028319	0.006956	0.008567	0.016600	0.000919	0.000123	0.022855	0.000793	0.003771
Other Non-Asphalt Surfaces 0.516491 0.059473 0.180350 0.1547	0.516491 0.059473 0.180350 0.154783 0.028319 0.006956 0.008567 0.016600 0.000919 0.000123 0.022855 0.000793 0.003771	0.516491 0.059473	0.180350	0.154783	0.028319	0.006956	0.008567	0.008567 0.016600	0.000919	0.000123	0.022855	0.000793	0.003771
Refrigerated Warehouse-No Rail 0.516491 0.059473 0.180350 0.154783 0.028319 0.006956 0.008567 0.016600 0.000919 0.000123 0.022855 0.000793 0.003771	0.516491	0.059473	0.180350	0.154783	0.028319	0.006956	0.008567	0.016600	783 0.028319 0.006956 0.008567 0.016600 0.000919 0.000123 0.022855 0.000793	0.000123	0.022855	0.000793	0.003771

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Kilowatt Hours of Renewable Electricity Generated

COZe		5 - 4,345.148 3	169.5130	0.0000	0.0000		
NZO		-0.090		0.0000	0.0000		
CH4	'yr	-0.7468	0.0291	0.0000	0.0000		
Total CO2	MT/yr	4,299.500 9	167.7322	0.0000 0.0000	0.0000		
Bio- CO2 NBio- CO2 Total CO2		4,299.500 4,299.500 9 9			0.0000		
Bio- CO2		0.0000	0.0000	0.0000 0.0000	0.0000		
PM2.5 Total		0.0000 0.00000	0.0000	0.0000	0.0000		
Exhaust PM2.5		0.0000		0.0000	0.0000		
Fugitive PM2.5						 	
PM10 Total		0.0000	0.0000	0.0000	0.0000		
Exhaust PM10	tons/yr	0.0000 0.0000	0.000.0	0.000.0	0.0000		
Fugitive PM10	tons						
SO2				0.0000	0.0000		
00				0.0000	0.0000		
×ON				0.0000 0.0000	0.0000		
ROG				0.0000	0.0000		
	Category	Electricity Mitigated	Electricity Unmitigated	NaturalGas Mitigated	NaturalGas Unmitigated		

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5.2 Energy by Land Use - NaturalGas

Unmitigated

CO2e		0.0000	0.000.0	0.0000	0.0000				
NZO			0.0000	0.0000	0.0000				
CH4	yr	0.0000 0.0000 0.0000	0.0000	0.0000	0.0000				
Total CO2	MT/yr	0.000.0	0.000.0	0.000.0	0.0000				
Bio- CO2 NBio- CO2 Total CO2		0.0000 0.0000	0.0000	0.0000	0.0000				
Bio- CO2			0.0000	0.0000	0.0000				
PM2.5 Total		0.0000	0.0000	0.0000	0.0000				
Exhaust PM2.5				0.0000	0.0000	0.0000			
Fugitive PM2.5					-			; 	
PM10 Total		0.0000 0.0000	0.000.0	0.0000	0.0000				
Exhaust PM10	s/yr	0.000.0	0.000.0	0.000.0	0.0000				
Fugitive PM10	tons	tons	tons/yr	tons	ton			 	
802		0.0000	0.000	0.0000	0.0000				
00					0.0000	0.0000 0.0000	0.0000	0.0000	
×ON		0.000.0	0.000.0	0.000.0	0.0000 0.0000				
ROG		0.0000 0.0000 0.0000	0.0000	0.000.0	0.0000				
NaturalGa s Use	kBTU/yr	0		0					
	Land Use	Manufacturing	Other Non- Asphalt Surfaces	Refrigerated Warehouse-No Rail	Total				

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5.2 Energy by Land Use - NaturalGas

Mitigated

CO2e		0.0000	0.000.0	0.000.0	0.0000					
N2O C				0.0000	0.0000					
N2		0.0000	0.0000							
CH4	MT/yr	0.0000	0.0000	0.0000	0.0000					
Total CO2	M	0.0000 0.0000	0.0000	0.0000	0.0000					
NBio- CO2		0.000.0	0.000.0	0.000.0	0.0000					
Bio- CO2 NBio- CO2 Total CO2		0.0000 0.0000	0.000.0	0.000.0	0.0000					
PM2.5 Total		0.0000	0.0000	0.0000	0.0000					
Exhaust PM2.5		0.0000	0.000.0	0.0000	0.0000					
Fugitive PM2.5							; 			
PM10 Total		0.000.0	0.000.0	0.0000	0.0000					
Exhaust PM10	tons/yr	tons/yr	tons/yr	tons/yr	tons/yr	tons/yr	0.000.0	0.000.0	0.000.0	0.0000
Fugitive PM10							tor			
S02		0.0000	0.0000	0.0000	0.0000					
00					0.0000	0.0000	0.0000	0.0000		
×ON		0.000.0	0.000.0	0.000.0	0.0000					
ROG		0.0000 0.0000 0.0000	0.000.0	0.0000	0.0000					
NaturalGa s Use	kBTU/yr	0	0	0						
	Land Use	Manufacturing	Other Non- Asphalt Surfaces	Refrigerated Warehouse-No Rail	Total					

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5.3 Energy by Land Use - Electricity Unmitigated

CO2e		0.0000	0.0000	169.5130	169.5130
N20	MT/yr	0.0000	0.0000	3.5300e- 003	3.5300e- 003
CH4	LM	0.000.0	0.000.0	0.0291	0.0291
Total CO2		0.0000	0.0000	167.7322	167.7322
Electricity Use	kWh/yr	0	0	1.94645e +006	
	Land Use	Manufacturing	Other Non- Asphalt Surfaces	Refrigerated Warehouse-No Rail	Total

	Electricity Use	Electricity Total CO2 Use	CH4	N2O	CO2e
Land Use	kWh/yr		MT	MT/yr	
Manufacturing	0	0.000.0	0.000.0	0.0000	0.0000
Other Non- sphalt Surfaces	0	0.0000	0.000.0	0.0000	0.0000
Refrigerated Varehouse-No Rail	1.94645e +006	167.7322	0.0291	3.5300e- 003	169.5130
Total		167.7322	0.0291	3.5300e- 003	169.5130

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5.3 Energy by Land Use - Electricity

Mitigated

C02e		- 1,128.665 3	2,257.330 7	-959.1523	- 4,345.148 3
N20	MT/yr	-0.0235	-0.0470	-0.0200	-0.0905
CH4	M	-0.1940	-0.3880	-0.1649	-0.7468
Electricity Total CO2 Use		1,116.808 3	2,233.616 6	-949.0761	- 4,299.500 9
Electricity Use	kWh/yr	-1.296e +007	-1.296e +007	-1.10136e +007	
	Land Use	Manufacturing	Other Non- Asphalt Surfaces	Refrigerated Warehouse-No Rail	Total

6.0 Area Detail

6.1 Mitigation Measures Area

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CO2e		7.3600e- 003	7.3600e- 003
N2O		0.0000	0.0000 7.3600e- 003
CH4	/yr	2.0000e- 005	2.0000e- 005
Total CO2	MT/yr	6.9000e- 003	6.9000e- 003
Bio- CO2 NBio- CO2 Total CO2		0.0000 6.9000e- 6.9000e- 2.0000e- 0.0000 7.3600e- 0.000 003 003 005 005	0.0000 6.9000e- 6.9000e- 003 003
Bio- CO2		0.0000	0.000.0
PM2.5 Total		3000e- 005)e- 1.0000e- 005
Exhaust PM2.5	ons/yr	1.0000e- 1.0000e- 005 005	1.0000e- 1.0 005
Fugitive PM2.5			
PM10 Total		1.0000e- 005	1.0000e- 005
Exhaust PM10		1.0000e- 1.0000e- 005 005	1.0000e- 1.005
Fugitive PM10	ton		r
802		0.0000	0.0000
00		3.5500e- 003	3.5500e- 003
×ON		3.0000e- 005	0.9752 3.0000e- 3.5500e- 0.0000 005 003
ROG		0.9752 3.0000e- 3.5500e- 0.0000 005 003	0.9752
	Category	Mitigated	Unmitigated

6.2 Area by SubCategory

Unmitigated

CO2e		0.0000	0.0000	7.3600e- 003	7.3600e- 003
N2O		0.000.0	0.0000	0.0000	0000
CH4	yr	0.0000 0.0000	0000	. 2.0000e- 005	2.0000e- 0 005
Total CO2	MT/yr	0.000.0	0.0000	6.9000e- 003	9000e- 003
Bio- CO2 NBio- CO2 Total CO2		0.0000 0.0000	0.0000	0 6.9000e- 003	6.9000e- 003
Bio- CO2		0.0000	0.0000	0.0000	0.0000
PM2.5 Total		0.0000	0000.0	1.0000e- 005	1.0000e- 005
Exhaust PM2.5	ons/yr	0.000.0	0.000.0	1.0000e- 005	1.0000e- 005
Fugitive PM2.5			 		
PM10 Total		0.0000	0.0000	1.0000e- 005	1.0000e- 005
Exhaust PM10		0.0000 0.0000	0.000	1.0000e- 005	1.0000e- 1 005
Fugitive PM10	tons				
S02				0.0000	0.0000
00				3.5500e- 003	3.5500e- 003
NOX				3.0000e- 005	0.9752 3.0000e- 3.5500e- 005 003
ROG		0.3183	0.6566	3.3000e- 3.0000e- 3.5500e- 004 005 003	0.9752
	SubCategory	Architectural Coating	• • • • •	Landscaping	Total

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6.2 Area by SubCategory

Mitigated

CO2e		0.0000	0.0000	7.3600e- 003	7.3600e- 003	
N20		0.0000	0.0000	0.0000	0000	
CH4	'yr	0.0000 0.0000	0.000.0	- 2.0000e- C 005	2.0000e- 0 005	
Total CO2	MT/yr	0.0000 0.0000	0.0000	3.9000e- 003	9000e- 003	
Bio- CO2 NBio- CO2 Total CO2		0.0000	0.0000	0 6.9000e- (6.9000e- 003	
Bio- CO2		0.0000	0.000	0.0000	0.0000	
PM2.5 Total		0.0000	0.000	1.0000e- 005	1.0000e- 005	
Exhaust PM2.5	ons/yr	0.0000	0.000.0	1.0000e- 005	1.0000e- 005	
Fugitive PM2.5				r 		
PM10 Total		0.0000	0.0000	1.0000e- 005	1.0000e- 005	
Exhaust PM10		0.0000	0.0000	1.0000e- 1 005	1.0000e- 005	
Fugitive PM10	tons					
S02				0.0000	0.0000	
00				3.5500e- 003	3.5500e- 003	
×ON				3.3000e- 3.0000e- 3.5500e- 004 005 003	3.0000e- 3.5500e- 005 003	
ROG		0.3183	0.6566	3.3000e- 004	0.9752	
	SubCategory	Architectural Coating		Landscaping	Total	

7.0 Water Detail

7.1 Mitigation Measures Water

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Brawley Solar Energy Facility - Imperial County, Annual

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

CO2e		0.6586	0.6586
N20	/yr	8.6500e- 2.1000e- 003 004	2.1000e- 004
CH4	MT/yr	8.6500e- 003	8.6500e- 003
Total CO2		0.3799	0.3799
	Category	Mitigated	Unmitigated

7.2 Water by Land Use

Unmitigated

	Indoor/Out door Use	Indoor/Out Total CO2 door Use	CH4	N20	CO2e
Land Use	Mgal		TM	MT/yr	
Manufacturing	0/0	0.0000	0.0000	0.0000 0.0000	0.0000
Other Non- Asphalt Surfaces	0/0	0.0000	0.0000	0.000.0	0.0000
Refrigerated Warehouse-No Rail	0.263939 / 0	0.3799	8.6500e- 003	2.1000e- 004	0.6586
Total		0.3799	8.6500e- 003	2.1000e- 004	0.6586

Brawley Solar Energy Facility - Imperial County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

7.2 Water by Land Use

Mitigated

CO2e		0.0000	0.0000	0.6586	0.6586
NZO	MT/yr	0.000.0	0.0000	2.1000e- 004	2.1000e- 004
CH4	MT	0.0000	0.0000	8.6500e- 003	8.6500e- 003
Indoor/Out Total CO2 door Use		0.0000	0.0000	0.3799	0.3799
Indoor/Out door Use	Mgal	0/0	0/0	0.263939 / 0	
	Land Use	Manufacturing	Other Non- Asphalt Surfaces	Refrigerated Warehouse-No Rail	Total

8.0 Waste Detail

8.1 Mitigation Measures Waste

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Brawley Solar Energy Facility - Imperial County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category/Year

CO2e		0.0000	0.0000
N20	MT/yr	0.0000 0.0000	0.0000
CH4	MT	0.0000	0.0000
Total CO2		0.000.0	0.0000
		Mitigated	Unmitigated

8.2 Waste by Land Use

Unmitigated

CO2e		0.0000	0.0000	0.0000	0.0000
N2O	MT/yr	0.0000	0.0000	0.0000	0.0000
CH4	M	0.0000	0.0000	0.0000	0.0000
Total CO2		0.000.0	0.0000	0.000.0	0.0000
Waste Disposed	tons	0	0	0	
	Land Use	Manufacturing	Other Non- Asphalt Surfaces	Refrigerated Warehouse-No Rail	Total

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Brawley Solar Energy Facility - Imperial County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.2 Waste by Land Use

Mitigated

CO2e		0.0000	0.0000	0.0000	0.000
N2O	MT/yr	0.0000	0.0000	0.0000	0.0000
CH4	MT	0.0000	0.0000	0.0000	0.0000
Total CO2		0.000.0	0.000.0	0.000.0	0.0000
Waste Disposed	tons	0	0	0	
	Land Use	Manufacturing	Other Non- Asphalt Surfaces	Refrigerated Warehouse-No Rail	Total

9.0 Operational Offroad

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

r Fuel Type	0.73 Diesel
Load Factor)
Horse Power	62
Hours/Year	26
Hours/Day	0.5
Number	←
Equipment Type	Emergency Generator

Boilers

Fuel Type
Boiler Rating
Heat Input/Year
Heat Input/Day
Number
Equipment Type

User Defined Equipment

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Brawley Solar Energy Facility - Imperial County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

10.1 Stationary Sources

Unmitigated/Mitigated

Number

Equipment Type

CO2e	MT/yr	0.6160	0.6160
N20		0.0000	0.0000
CH4		9.0000e- 005	9.0000e- 005
Total CO2		0.6139	0.6139
Bio- CO2 NBio- CO2 Total CO2		0.0000 0.6139	0.6139
Bio- CO2		0.0000	0.0000
PM2.5 Total	tons/yr	1.9000e- 004	e- 1.9000e- 004
Exhaust PM2.5		1.9000e- 004	1.9000e- 004
Fugitive PM2.5			
PM10 Total		1.9000e- 004	1.9000e- 004
Exhaust PM10		1.9000e- 004	1.9000e- 004
Fugitive PM10			
SO2		1.0000e- 005	1.0000e- 005
00		4.8000e- 003	4.8000e- 003
NOX		1.3200e- 4.3100e- 4.8000e- 003 003 003	4.3100e- 003
ROG		1.3200e- 003	1.3200e- 003
	Equipment Type	Emergency Generator - Diesel (50 - 75 HP)	Total

11.0 Vegetation

ARCHAEOLOGICAL AND PALEONTOLOGICAL ASSESSMENT REPORT FOR THE BRAWLEY SOLAR PROJECT, BRAWLEY, IMPERIAL COUNTY, CALIFORNIA

Prepared for:

ORNI 30, LLC 6140 Plumas Street Reno, Nevada 89519

Prepared by:

CHAMBERS GROUP, INC.

9620 Chesapeake Drive, Suite 202 San Diego, California 92123 (858) 541-2800

March 2021

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NATIONAL ARCHAEOLOGICAL DATABASE INFORMATION

Authors: Sandra Pentney, Kellie Kandybowicz, Niranjala Kottachchi, Eduvijes Davis-Mullens, Richard

Shultz

Firm: Chambers Group, Inc.

Client/Project Proponent: ORNI 30, LLC

Report Date: March 2021

Report Title: Archaeological and Paleontological Assessment Report for the Brawley Solar Project,

Brawley, Imperial County, California

Type of Study: Cultural Resources Phase 1 Pedestrian Survey

New Sites: 6

Updated Sites: 1

USGS Quad: Westmorland East 7.5-minute quadrangle

Acreage: 225

Permit Numbers: N/A

Key Words: County of Imperial, City of Brawley, Positive Survey, CEQA, Intensive Pedestrian Survey, Best Canal, Spruce No. 3 Canal, Spruce No. 3 Drain, trash scatter, Niland to Calexico Railroad, *Westmorland*

East USGS Quadrangle

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SECTION 1.0 – INTRODUCTION

Chambers Group, Inc. (Chambers Group) was retained by ORNI 30, LLC (ORNI) to complete an archaeological assessment as well as a paleontological assessment, including a literature review and pedestrian survey, for the development of the Brawley Solar Project (Project) in Brawley, Imperial County (County), California. The proposed Project includes the construction and operation of a solar energy farm and associated facilities.

The purpose of this investigation is to assess the potential for significant archaeological and paleontological deposits and/or materials within the Project site and to determine if the current Project has the potential to adversely affect any significant cultural or paleontological materials. Chambers Group completed an archaeological and paleontological literature review, records search, and intensive pedestrian survey of the 225-acre proposed area. This report outlines the archaeological and paleontological findings and results of both efforts.

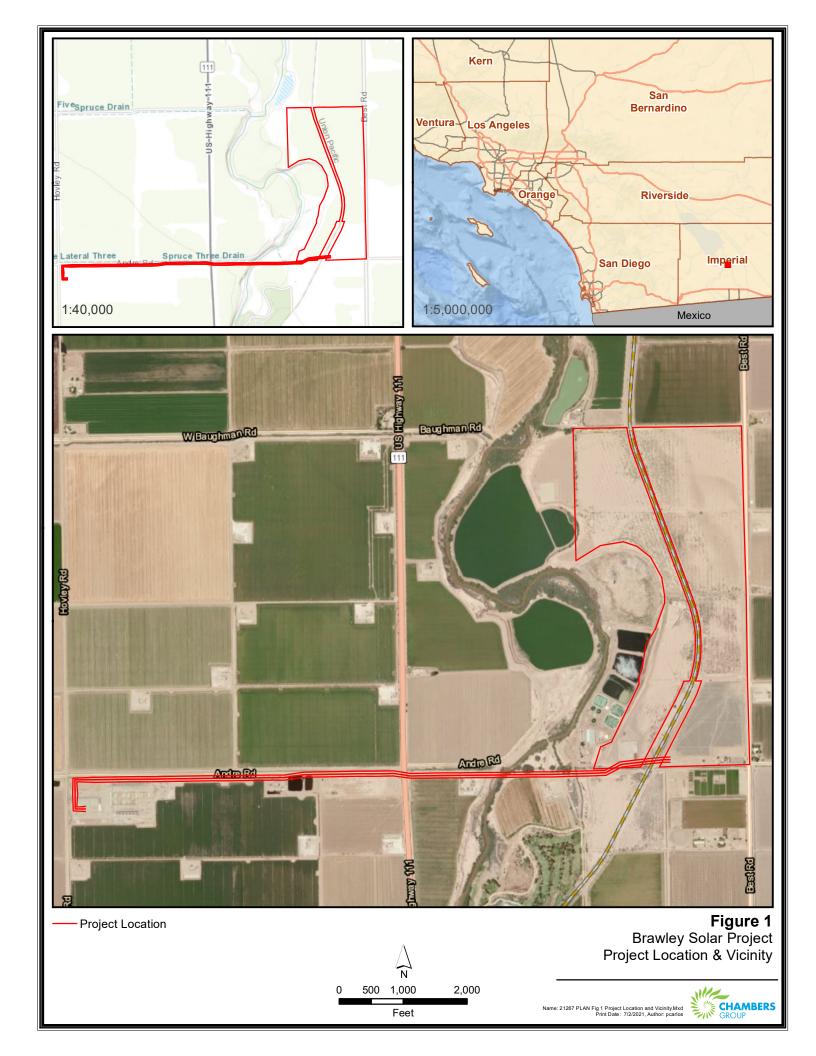
The following studies have been conducted in accordance with the California Environmental Quality Act (CEQA). This report includes appropriate mitigation measures to ensure less than significant impacts to any cultural and paleontological resources potentially affected during construction.

1.1 PROJECT DESCRIPTION

ORNI is proposing to build, operate, and maintain the Brawley Solar Energy Facility, a 40 megawatt (MW)/160 megawatt-hour (MWh) photovoltaic (PV) solar farm and 40 MW/160 MWh battery energy storage system (BESS) on approximately 225 acres in Brawley, Imperial County. Power generated by the Project would be low-voltage direct current (DC) power that would be collected and routed to a series of inverters and their associated pad-mounted transformers. The inverters would convert the DC power generated by the panels to alternating current (AC) power, and the pad-mounted transformers would step up the voltage. The Project would connect to the North Brawley Geothermal Power Plant southwest of the Project site via an approximately 1.6-mile-long aboveground 92 kilovolt (kV) generation tie line (gen-tie line). Energy generated and stored by the Project will be sold to the wholesale market or retail electric providers in furtherance of the goals of the California Renewable Energy Portfolio Standards and other similar renewable programs in the Pacific Southwest power market.

1.2 PROJECT LOCATION

The Project is located 19 miles north of El Centro at North Best Avenue, Brawley, California, on six privately owned parcels (Project site). The Project is located within the U.S. Geological Survey (USGS) *Westmorland East*, California, 7.5-minute topographic quadrangle, Township 13 South, Range 14 East, in Sections 10, 15, 16, and 17. Currently the Project site contains fallow alfalfa fields. The Project site is bordered by undeveloped agricultural land to the north and east and a mixture of undeveloped agricultural land and dirt lots used for staging activities to the south, and the City of Brawley Wastewater Treatment Plant is located along the western edge of the Project site. The elevation at the Project site is approximately 145 feet below mean sea level (bmsl). Maps of the Project location and Project vicinity are provided in Figure 1.



1.3 REGULATORY FRAMEWORK

1.3.1 California Environmental Quality Act

Work for this Project was conducted in compliance with CEQA. The regulatory framework as it pertains to cultural resources under CEQA is detailed below.

1.3.2 Paleontological Resources

CEQA requires that public agencies and private interests identify the potential environmental consequences of their projects on any object or site of significance to the scientific annals of California (Division I, California Public Resources Code [PRC] Section 5020.1 [b]). Appendix G in Section 15023 provides an Environmental Checklist of questions (PRC 15023, Appendix G, Section VII, Part f) that includes the following: "Would the project directly or indirectly destroy a unique paleontological resource or site or unique geological feature?" CEQA does not define "a unique paleontological resource or site." However, the Society of Vertebrate Paleontology (SVP) has provided guidance specifically designed to support state and federal environmental review. The SVP broadly defines significant paleontological resources as follows (SVP 2010, page 11): "Fossils and fossiliferous deposits consisting of identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are considered to be older than recorded human history and/or older than middle Holocene (i.e., older than about 5,000 radiocarbon years)."

Significant paleontological resources are determined to be fossils or assemblages of fossils that are unique, unusual, rare, diagnostically important, or are common but have the potential to provide valuable scientific information for evaluating evolutionary patterns and processes, or which could improve our understanding of paleochronology, paleoecology, paleophylogeography, or depositional histories. New or unique specimens can provide new insights into evolutionary history; however, additional specimens of even well represented lineages can be equally important for studying evolutionary pattern and process, evolutionary rates, and paleophylogeography. Even unidentifiable material can provide useful data for dating geologic units if radiometric dating is possible. As such, common fossils (especially vertebrates) may be scientifically important and therefore considered significant.

1.3.3 Cultural Resources

Under the provisions of CEQA, including the CEQA Statutes (PRC §§ 21083.2 and 21084.1), the CEQA Guidelines (Title 14 California Code of Regulations [CCR], § 15064.5), and PRC § 5024.1 (Title 14 CCR § 4850 et seq.), properties expected to be directly or indirectly affected by a proposed project must be evaluated for California Register of Historical Resources (CRHR) eligibility (PRC § 5024.1).

The purpose of the CRHR is to maintain listings of the state's historical resources and to indicate which properties are to be protected, to the extent prudent and feasible, from material impairment and substantial adverse change. The term *historical resources* includes a resource listed in or determined to be eligible for listing in the CRHR; a resource included in a local register of historical resources; and any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant (CCR § 15064.5[a]). The criteria for listing properties in the CRHR were expressly developed in accordance with previously established criteria developed for listing in the National Register

of Historic Places (NRHP). The California Office of Historic Preservation (OHP 1995:2) regards "any physical evidence of human activities over 45 years old" as meriting recordation and evaluation.

California Public Resources Code

Section 5097.5 of the PRC states:

"No person shall knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor."

As used in this PRC section, "public lands" means lands owned by, or under the jurisdiction of, the state or any city, county, district, authority, or public corporation, or any agency thereof. Consequently, public agencies are required to comply with PRC 5097.5 for their own activities, including construction and maintenance, as well as for permit actions (e.g., encroachment permits) undertaken by others.

California Register of Historic Resources

A cultural resource is considered "historically significant" under CEQA if the resource meets one or more of the criteria for listing in the CRHR. The CRHR was designed to be used by state and local agencies, private groups, and citizens to identify existing cultural resources within the state and to indicate which of those resources should be protected, to the extent prudent and feasible, from substantial adverse change. The following criteria have been established for inclusion in the CRHR. A resource is considered significant if it:

- 1. is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- 2. is associated with the lives of persons important in our past;
- 3. embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
- 4. has yielded, or may be likely to yield, information important in prehistory or history.

In addition to meeting one or more of the above criteria, historical resources eligible for listing in the CRHR must retain enough of their historic character or appearance to be able to convey the reasons for their significance. Such integrity is evaluated in regard to the retention of location, design, setting, materials, workmanship, feeling, and association.

Under CEQA, if an archeological site is not a historical resource but meets the definition of a "unique archeological resource" as defined in PRC § 21083.2, then it should be treated in accordance with the provisions of that section. A *unique archaeological resource* is defined as follows:

• An archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information;
- Has a special and particular quality, such as being the oldest of its type or the best available example of its type; or
- o Is directly associated with a scientifically recognized important prehistoric or historic event or person.

Resources that neither meet any of these criteria for listing in the CRHR nor qualify as a "unique archaeological resource" under CEQA PRC § 21083.2(g) are viewed as not significant. Under CEQA, "A non-unique archaeological resource need be given no further consideration, other than the simple recording of its existence by the lead agency if it so elects" (PRC § 21083.2[h]).

Impacts that adversely alter the significance of a resource listed in or eligible for listing in the CRHR are considered a significant effect on the environment. Impacts to historical resources from a proposed project are thus considered significant if the project (1) physically destroys or damages all or part of a resource; (2) changes the character of the use of the resource or physical feature within the setting of the resource, which contributes to its significance; or (3) introduces visual, atmospheric, or audible elements that diminish the integrity of significant features of the resource.

Imperial County

Section III(B) of the Imperial County Conservation and Open Space Element describes the cultural resources, goals, and objectives to protect such resources (County of Imperial 2016). The planning goals and objectives are described below.

Goal 3 of the goals and objectives section of the Imperial County Conservation and Open Space Element addresses the preservation of cultural resources. Goal 3 states that the County will "preserve the spiritual and cultural heritage of the diverse communities of Imperial County" (County of Imperial 2016). Three objectives are enumerated to assist in implementation of the goal:

- **Objective 3.1:** Project and preserve sites of archaeological, ecological, historical, and scientific value, and/or cultural significance.
- **Objective 3.2:** Develop management strategies to preserve the memory of important historic periods, including Spanish, Mexican, and early American settlements of Imperial County.
- **Objective 3.3:** Engage all local Native American Tribes in the protection of tribal cultural resources, including prehistoric trails and burials sites.

City of Brawley

The section regarding Resource Management Elements (RME) in the City of Brawley General Plan Update 2030 describes the cultural and paleontological goals, objectives, and policies to protect such resources (City of Brawley 2008).

IMP-RME Goal 6: Preserve and Promote the Cultural Heritage of the City and Surrounding Region

• IMP-RME Program 6.1

Protect Historical and Archaeological Resources: During the development review process, identify proposed development projects located near or on sites with important archaeological and historic resources or in areas where cultural resources are expected to occur. Require a site inspection by a professional archaeologist and assess potential impacts of the proposed project on archaeological and/or historic resources. If significant impacts are identified according to Appendix K of the California Environmental Quality Act, either modify the project to avoid impacting the resource or implement mitigation measures to reduce the impact. Mitigation may involve archaeological investigation and resource recovery. Enforce the provision of the California Environmental Quality act regarding the preservation or salvage of significant historical and archaeological resources discovered before or during construction activities.

IMP-RME Goal 7: Preserve and Promote the Cultural Heritage of the City and Surrounding Region.

- RME Objective 7.1: Prevent the loss or compromise of significant archeological, historical, and other cultural resources located within the City.
 - RME Policy 7.1.1: Identify, designate, and protect facilities of historical significance and maintain an inventory.
 - o RME Policy 7.1.2: Promote the education and awareness of the City's cultural resources.
 - RME Policy 7.1.3: The City shall consult with the Native American tribes under SB 18 for General Plan Amendments.
 - RME Policy 7.1.4: When significant archeological sites or artifacts are discovered on a site, coordination with professional archeologists, relevant state agencies, and concerned Native American tribes regarding preservation of sites or professional retrieval and preservation of artifacts prior to development of the site shall be required.
 - RME Policy 7.1.5: If archeological excavations are recommended on a project site, the City shall require that all such investigations include Native American consultation, which shall occur prior to project approval.
 - RME Policy 7.1.6: Require professionally prepared archaeological reports be completed by a certified archeologist. The report shall include a literature search and a site survey for any project located within a potential sensitive area as defined by the City's Important Archaeological Areas map or areas identified by the local Native American tribes.
 - RME Policy 7.1.7: Assure that adequate review of subsurface paleontological sensitivity is conducted prior to ground disturbance.
 - RME Policy 7.1.8: Ensure that development adjacent to a place, structure or object found to be of historic significance should be designed so that the uses permitted and the architectural design will protect the visual setting of the historical site.

RME Policy 7.1.9: Consider acquisition of identified historical buildings for public uses.

Plan:

To prevent the destruction of important artifacts during development in these areas, the City will require a site inspection by a professional archaeologist during the development review process for all projects located in the potential resource area. If the archaeologist indicates that significant resources exist on the site and will be impacted by the proposed development project, the impact shall be avoided or mitigated according to the California Environmental Quality Act Guidelines. Mitigation may involve archaeological investigation and resource recovery. The City will also develop and maintain an inventory of archaeological sites in the Planning Area (City of Brawley 2008).

SECTION 2.0 – SETTINGS

2.1 ENVIRONMENTAL SETTING

The proposed Project is located within the mid-region of the lower Colorado Desert physiography. Brawley, Imperial County, California, has an average annual temperature of 72.3 degrees Fahrenheit (°F) (22.4 degrees Celsius [22°C]). Virtually no rainfall occurs during the year; about 2.4 inches of precipitation falls annually and the difference in precipitation between the driest month and the wettest month is 0.39 inch. Average temperatures vary during the year; the warmest month of the year is July, with an average temperature of 91.6 °F (33.1 °C). In January, the average temperature is 54.0 °F (12.2 °C) (Climate-Data 2021).

2.1.1 <u>Habitats / Vegetation Communities</u>

Seven vegetation communities — Quail Bush Scrub, Agricultural, Bare Ground, Disturbed, Bush Seepweed Scrub, Arrow Weed Thickets, and Tamarisk Thickets — were observed within the Project site.

Areas classified as Quail Bush Scrub are dominated by quail bush with scattered bush seepweed (Sueda nigra) present in areas where the habitat gently slopes into more alkaline soils. Plant species observed within the Project site included bush seepweed, big saltbush (Atriplex lentiformis), and spiny chlorocantha (Chloracantha spinosa). Large swaths of the Project site consist of plots of agricultural fields that are no longer in use. Bermuda grass (Cynodon dactylon) is found in these areas with alfalfa (Medicago sativa) seedlings in lower numbers.

Agricultural fields are similar to Bare Ground habitat where areas have higher water permeability and higher fossorial rodent habitat potential. Mexican palo verde (*Parkinsonia aculeata*) are planted along the outside of several agriculture fields as wind breaks for agricultural purposes; these areas are therefore considered agricultural habitat.

Bare Ground (BG) areas are generally devoid of vegetation but do not contain any form of pavement. BG has higher water permeability and higher fossorial rodent habitat potential. BG is present throughout the entire Project site with large, uninterrupted expanses in the eastern portion of the Project site. Scattered, dead Mediterranean tamarisk (*Tamarix* sp.) seedlings were the only vegetation observed in these areas.

Bush seepweed is dominant in the shrub canopy with scattered quail bush present. The shrub layer is intermittent to continuous with an herbaceous layer that is very sparse. Stands occur in gently sloping plains bordering agricultural fields or irrigation ditches and areas with disturbed hydrology due to manmade alteration. Soils are deep and saline or alkaline (Sawyer et al. 2009). Species observed within the Project site included bush seepweed and big saltbush.

The shrub canopy is intermittent to continuous, with shrubs reaching 2 to 3 meters in height. Vegetation is dominated by arrow weed (*Pluchea sericea*) and extends along the water feature, occasionally extending over the bank and into the access road. The herbaceous layer is open and intermittent, existing in between stands of cattail (*Typha* sp.) and arrow weed. The habitat exists in irrigation ditches consisting of soils that are sandy and loamy where water is permeable.

Plant species observed included arrow weed, tamarisk, cattail, big saltbush, saltgrass (*Distichlis spicata*), and salt heliotropie (*Heliotropium curassavicum*). Tamarisk dominates the tree canopy and is thick and

continuous. This non-native shrub layer is sparse with isolated quail bush present, while the herbaceous layer contains very little vegetation. Trees average 15 meters in height exist in irrigation ditches and on the upper banks along water features. Species observed within the Project site included tamarisk and big saltbush.

2.1.2 Geological and Paleontological

The survey area is located within the Imperial Valley and is within a large geologic structure referred to as the Salton Trough, a graben or rift valley extending approximately 1,000 miles in length. This graben was created when the San Andreas Fault system and the East Pacific Rise split Baja California from mainland Mexico approximately 5 million years ago. The southern portion of this rift valley is now known as the Gulf of California, while the northern part is known as the Salton Trough. Plate tectonic activity has continued to open this rift with the Salton Trough as the hinge point. The North American Plate is to the east and the Pacific Plate to the west. The Colorado River may have begun depositing huge loads of silt in the upper trough as early as 5.5 million years ago (Alles 2004).

By some time in the Pliocene Epoch (2 to 4 million years ago), the river had created a delta of sufficient height to form a dam isolating the Imperial Valley and Coachella Valley portions of the Salton Trough from the Gulf of California (Waters 1980). This silt dam continues to keep seawater out of the Salton Trough, which is more than 200 feet below sea level. A series of very high freshwater lake stands that occurred during the late Pleistocene have been documented in the Salton Trough, suggesting that the Colorado River began flowing into the Salton Trough on an occasional basis from that time. Ranging in elevation up to 170 feet above sea level, these Pleistocene freshwater lake shorelines date to between 25,000 and 45,000 years ago (Waters 1980). The height of these Pleistocene lake stands reflects the elevation of the natural silt dam which separates the Gulf from the Salton Trough. These Pleistocene lake stands have been called Lake Cahuilla to refer to both the Pleistocene and Holocene lakes (Waters 1980).

Site-Specific Geology and Soils

After review of U.S. Department of Agriculture (USDA) Soil Conservation Service and by referencing the USDA Natural Resources Conservation Service (NRCS) Web Soil Survey (USDA 2020), it was determined that the survey area is located within the Imperial Valley Area (CA683); six soil types are known to occur within and/or adjacent to the site and are described below.

Badland occurs along the western portion of the Project site. The parent material is composed of alluvium. This soil is not rated as hydric, and the runoff class is high.

The Imperial Silty Clay complex is seen throughout the Project site. The parent material is clayey alluvium derived from mixed or clayey lacustrine deposits. The available water capacity is classified as moderate (approximately 8.3 inches) with a depth to the water table of more than 80 inches (USDA 2020).

Imperial Glenbar Silty Clay Loam occurs along the western portion and eastern edge of the Project site. The parent material is clayey alluvium derived from mixed and/or clayey lacustrine deposits. The available water capacity is moderate (approximately 8.6 inches) with a depth to the water table of more than 80 inches.

Indio-Vent complex occurs in the southern portion of the Project site just east of the New River. The parent material is alluvium derived from mixed and/or eolian deposits. The available water capacity is moderate (approximately 8.5 inches) with a depth to the water table of more than 80 inches.

Meloland Very Fine Sandy Loam occurs along the drainages in the southern portion of the Project site. The parent material is alluvium derived from mixed and/or eolian deposits. The available water capacity is moderate (approximately 7.8 inches) and a low runoff class. The depth to the water table is more than 80 inches.

Vint and Indio Very Fine Sandy Loam occurs along the drainage in the southwest portion of the Project site. The parent material is alluvium derived from mixed sources and/or eolian deposits. The available water capacity is moderate at about 6.8 inches. The depth to the water table is more than 80 inches.

Paleontological Significance

Lake Cahuilla was a former freshwater lake that periodically occupied a major portion of the Salton Trough during late Pleistocene to Holocene time (approximately 37,000 to 240 years ago), depositing sediments that underlie the entire Project site (mapped as Quaternary lake deposits by Jennings [1967]). Generally, Lake Cahuilla sediments consist of an interbedded sequence of both freshwater lacustrine (lake) and fluvial (river/stream) deposits. The Lake Cahuilla Beds have yielded well-preserved subfossil remains of freshwater clams and snails (Stearns 1901) and sparse remains of freshwater fish (Hubbs and Miller 1948). The paleontological resources of the Lake Cahuilla Beds are considered significant because of the paleoclimatic and palaeoecological information they can provide (Jefferson 2006), and these deposits are therefore assigned a high paleontological potential (SVP 2010).

Existing Conditions

The original survey area included a small section of the lot located on the southeast corner of Andre Road and Western Avenue. This 5.5-acre section of the Project area was not surveyed due to the presence of the existing, fenced-off Ormat Brawley North facility, which was built between 2006 and 2008 (NETR Online 2020). The level of disturbance was evaluated to be high, and it was determined unnecessary to survey that small section of the Project area.

2.2 CULTURAL SETTING

2.2.1 Prehistory

The Project site is located in the mid-section of the lower Colorado Desert, in which ancient Lake Cahuilla was situated – the present-day Salton Sea is illustrative of lower stands of the former Ancient Lake Cahuilla. In addition to paleontological potential, archaeological deposits found around the shoreline of Lake Cahuilla radiocarbon date to at least 1,440 years before present (B.P.) (Waters 1983; Hubbs et al. 1962) and shows demonstrable evidence of cultural activity in the area. Lake Cahuilla presented a massive freshwater oasis, allowing seasonal occupations resulting in archaeological deposits that include pottery, ground and chipped stone artifacts, and archaeological features such as rock fish traps (Waters 1983; Phukan et al. 2019). As an ethnographic landscape, the Cahuilla, Kumeyaay, Kamia, and the tribes which now comprise the Colorado River Indian Tribes (CRIT), the Mojave, Chemehuevi, Hopi, and Navajo settled in various locations around the basin, including the Colorado delta (Phukan et al. 2019). The Kumeyaay and Cahuilla constructed the stone fish trap features, which can be difficult to identify during pedestrian

transect survey. Moreover, evidence from middens and human coprolites suggest subsistence on either razorback suckers or bonytail chubs, demonstrating environmental importance of this area (Phukan et al. 2019). Cultural resources located in the area tend to be associated with Lake Cahuilla due to its temporal context and functional use as a landscape, which yield archaeological data of high significance regarding how people adapted to the changing environment around the lake.

Archaeological studies have been limited in the Salton Sea desert region. This paucity of archaeological investigation has resulted in undefined and imperfect archaeological classification schemas and typologies. Therefore, the prehistoric time periods used by archaeologists to describe the southern Imperial County desert region borrow heavily from those chronologies established for San Diego County prehistory, with some minor Colorado Desert-specific clarifications. The three general time periods accepted in the region are the San Dieguito Complex, the Archaic period, and the Late Prehistoric period. These periods are briefly described below.

The earliest recognized occupation of the region, dating to 10,000 to 8,000 years before present (B.P.), is known as the San Dieguito complex (Rogers 1939, 1945). Assemblages from this occupation generally consist of flaked stone tools. Evidence of milling activities is rare for sites dating to this period. It is generally agreed that the San Dieguito complex shows characteristics of the Western Pluvial Lakes Tradition (WPLT), which was widespread in California during the early Holocene. The WPLT assemblage generally includes scrapers, choppers, and bifacial knives. Archaeologists theorize this toolkit composition likely reflects a generalized hunting and gathering society (Moratto 1984; Moratto et al. 1994; Schaeffer and Laylander 2007).

The following period, the Archaic (8,500 to 1,300 B.P.), is traditionally seen as encompassing both coastal and inland adaptations, with the coastal Archaic represented by the shell middens of the La Jolla complex and the inland Archaic represented by the Pauma complex (True 1980). Coastal settlement is also thought to have been significantly affected by the stabilization of sea levels around 4,000 years ago that led to a general decline in the productivity of coastal ecosystems. Artifacts associated with this period include milling stones, unshaped manos, flaked cobble tools, Pinto-like and Elko projectile points, and flexed inhumations (Schaefer and Laylander 2007). Colorado Desert rock art studies have led researchers to suggest Archaic-Period origins for many petroglyph and pictograph styles and elements common in later times (Whitley 2005). More recently, several important late Archaic-period sites have been documented in the northern Coachella Valley, consisting of deeply buried middens with clay-lined features and living surfaces, cremations, hearths, and rock shelters. Faunal assemblages show a high percentage of lagomorphs (rabbits and hares). The larger sites suggest a more sustained settlement type than previously known for the Archaic period in this area (Schaefer and Laylander 2007).

The Late Prehistoric period (1,300 to 200 B.P.) is marked by the appearance of small projectile points indicating the use of the bow and arrow, the common use of ceramics, and the general replacement of inhumations with cremations, all characteristic of the San Luis Rey complex as defined by Meighan (1954). The San Luis Rey complex is divided temporally into San Luis Rey I and San Luis Rey II, with the latter distinguished mainly by the addition of ceramics. Along the coast of northern San Diego County, deposits containing significant amounts of Donax shell are now often assigned to the Late Prehistoric, based on a well-documented increase in the use of this resource at this time (e.g., Byrd and Reddy 1999). The inception of the San Luis Rey complex is suggested by True (1966; True et al. 1974) to mark the arrival of Takic speakers from regions farther inland. Waugh (1986) is in general agreement with True but suggests that the migration was probably sporadic and took place over a considerable period. Titus (1987) cites burials showing physical differences between pre- and post-1,300 B.P. remains to further support this

contention. However, some researchers have suggested that these Shoshonean groups may have arrived considerably earlier, perhaps as early as 4,000 years ago. Vellanoweth and Altschul (2002:102-105) provide an excellent summary of the various avenues of thought on the Shoshonean Incursion.

2.2.2 **Ethnography**

The Project site was occupied by the Cahuilla, Quechan, Kumeyaay, Kamia, and the Colorado River Indian Tribes (CRIT). The two closest tribal reservations to the Project site are the Torres-Martinez Reservation located to northwest of the Project site and Fort Yuma reservation located to the southeast of the Project site. The Torres-Martinez Indian Reservation is currently home to the desert Cahuilla Indians and is on the northwest side of the Salton Sea, roughly 55 miles from the Project site. Fort Yuma is located approximately 51 miles closer to the California-Arizona border and is the home of the Quechan. Following is a brief ethnographic and archaeological summary of the Cahuilla, Quechan, Kumeyaay, Kamia, and CRIT.

Cahuilla

The Project site currently falls within the ethnographic territory of the Cahuilla, whose ancestors may have entered this region of Southern California approximately 3,000 years ago (Moratto 1984: 559-560). The Cahuilla ancestral territory is located near the geographic center of Southern California and varied greatly topographically and environmentally, ranging from forested mountains to desert areas. Natural boundaries such as the lower Colorado Desert provided the Cahuilla separate territory from the neighboring Mojave, Ipai, and Tipai. In turn, mountains, hills, and plains separated the Cahuilla from the adjacent Luiseño, Gabrielino, and the Serrano (Bean 1978: 575).

The Cahuilla relied heavily on the exploitation and seasonal availability of faunal and floral resources through a pattern of residential mobility that emphasized hunting and gathering. Important floral species used in food, for manufacturing of products, and/or for medicinal uses primarily included acorns, mesquite and screw beans, piñon nuts, and various cacti bulbs (Bean 1978:578). Coiled-ware baskets were common and used for a variety of tasks including food preparation, storage, and transportation (Bean 1978:579).

Networks of trails linked villages and functioned as hunting, trading, and social conduits. Trade occurred between the Cahuilla and tribes such as the Gabrielino as far west as Santa Catalina and the Pima as far east as the Gila River. Both goods and technologies were frequently exchanged between the Cahuilla and nearby Serrano, Gabrielino, and Luiseño cultural groups (Bean 1978:575-582).

The Cahuilla are believed to have first come into contact with Europeans prior to the Juan Bautista de Anza expedition in 1774; however, little direct contact was established between the Cahuilla and the Spanish except for those baptized at the Missions San Gabriel, San Luis Rey, and San Diego (Bean 1978:583-584). Following the establishment of several *asistencias* near the traditional Cahuilla territories, many Spanish cultural forms — especially agriculture and language — were adopted by the Cahuilla people (Bean 1978:583-584; Lech 2012:17-30).

Through the Rancho and American periods, the Cahuilla continued to retain their political autonomy and lands despite more frequent interactions with European-American immigrants. In 1863, a large number of the population was killed by a sweeping smallpox epidemic that affected many of the tribal groups in Southern California. The first reservations established in Imperial County ca. 1865 saw many of the Cahuilla remaining on their traditional lands. After 1891, however, all aspects of the Cahuilla economic,

political, and social life were closely monitored by the federal government; a combination of missionaries and government schools drastically altered the Cahuilla culture (Bean 1978:583-584).

Quechan

The Quechan are a Native American Tribe that primarily occupied the surrounding area of the Gila and Colorado Rivers. Historically, the Quechan people were given the name "Yuma" by the Spanish explorers. They are one of several Yuman-speaking groups that resided in California and western Arizona (Bee 1983).

The Quechan lived in small settlements located along the Colorado River, north and south of the Gila River confluence, and along the Gila River. These settlements consisted of several hundred people organized into extended family groups. These settlements were created to be on the move. Often times the families would move into the river bottom during the summer farming season and would return to the high banks of the river during spring flooding. The settlements would also move up or down the rivers depending on food shortages or warfare. Substantial housing was not common among Quechan villages because of the warm climate. Dome-shaped arrow weed houses and ramadas were the most common since it allowed for airflow (Bee 1983; Kroeber 1976).

The Quechan were primarily gatherers and farmers. Hunting wild game was not a viable option due to the harsh desert conditions found outside the Colorado River floodplain. The Quechan cultivated food such as maize, melons, pumpkins, wild grass seeds, and beans. Other crops such as black-eyed beans, watermelon, and wheat were introduced by European immigrants. The Quechan practiced a varied farming strategy, meaning they would plant several food crops at various time of the year. Maize and melons were often planted in February and were not dependent on seasonal flooding. Other crops were planted after the spring flooding of the Colorado River. In autumn, wheat was often planted and harvested just before the spring flooding; while wild grasses, which provided seeds that were ground into a meal, were planted into less fertile soils. Some other wild foods were screw bean pods and mesquite, which could be gathered in times of a low-yielding crop year (Bee 1983; Kroeber 1976).

Warfare was a basis of Quechan culture. They often used two types of warfare: the raiding party and the war party. The raiding party was often used to evoke mayhem and capture horses or captives. The war party consisted of a village raid followed by an organized battle in which both parties would face one another in two lines ending in hand-to-hand combat. Warfare among the tribes was intertwined with myth and ceremony. Traditionally, warfare was connected to ritual and tribal prestige rather than conflict over resources or territory. The Quechan often engaged in warfare with both the Maricopa and the Cocopah, who were sometimes called the Pima. Warfare may have increased in intensity and scale in the eighteenth and early nineteenth century for economic reasons. This departure from the ritual warfare tradition may have been related to the taking of captives to trade to the Spanish for horses or other goods (Bee 1983; Kroeber 1976).

Kumeyaay

The Native American people occupying the region also included the Kumeyaay. The Kumeyaay or Tipailpai were formerly known as the Kamia or Diegueños, the former Spanish name applied to the Mission Indians living along the San Diego River and are referred to as the Kumiai in Mexico. Today, members of the tribe prefer to be called Kumeyaay (Luomala 1978). The territory of the Kumeyaay extended north from Todos Santos Bay near Ensenada, Mexico, to the mouth of the San Luis Rey River in north San Diego County, and east to the Sand Hills in central Imperial Valley near the current Project site. The Kumeyaay

occupied the southern and eastern desert portions of the territory, while the Ipai inhabited the northern coastal region (Luomala 1978).

The primary source of subsistence for the of Kumeyaay was vegetal food. Seasonal travel followed the ripening of plants from the lowlands to higher elevations of the mountain slopes. Buds, blossoms, potherbs, wild seeds, cactus fruits, and wild plums were among the diet of Kumeyaay. The Kumeyaay practiced limited agriculture within the floodplain areas of their territory. Melons, maize, beans, and cowpeas were planted. Women sometimes transplanted wild onion and tobacco plants to convenient locations and sowed wild tobacco seeds. Deer, rodents, and birds provided meat as a secondary source of sustenance. Families also gathered acorns and piñon nuts at the higher altitudes. Village locations were selected for seasonal use and were occupied by exogamous, patrilineal clans. Three or four clans would winter together and then disperse into smaller bands during the spring and summer (Luomala 1978).

Kumeyaay structures varied with the seasons. Summer shelter consisted of a wind break, tree, or a cave fronted with rocks. Winter dwellings had slightly sunken floors with dome-shaped structures made of brush thatch covered with grass and earth (Gifford 1931; Luomala 1978).

Upon death, the Kumeyaay cremated the body of the deceased. Ashes were placed in a ceramic urn and buried or hidden in a cluster of rocks. The family customarily held a mourning ceremony one year after the death of a family member. During this ceremony, the clothes of the deceased individual were burned to ensure that the spirit would not return for his or her possessions (Gifford 1931; Luomala 1978).

It is estimated that the pre-contact Kumeyaay population living in this region ranged from approximately 3,000 (Kroeber 1925) to 9,000 (Luomala 1978). Beginning in 1775, the semi-nomadic life of the Kumeyaay began to change as a result of contact with European-Americans, particularly from the influence of the Spanish missions. Through successive Spanish, Mexican, and Anglo-American control, the Kumeyaay people were forced to adopt a sedentary lifestyle and accept Christianity (Luomala 1978). As of 1968, Kumeyaay population was somewhere between approximately 1,322 (Shipek 1972 in Luomala 1978) and 1,522 (Luomala 1978), and by 1990 an estimated 1,200 Kumeyaay lived on reservation lands while 2,000 lived elsewhere (Pritzker 2000).

Trade was a very important feature of Kumeyaay subsistence; coastal groups traded salt, dried seafood, dried greens, and abalone shells to inland and desert groups for products such as acorns, agave, mesquite beans, and gourds (Almstedt 1982:10; Cuero 1970:33; Luomala 1978:602). Travel and trade were accomplished by means of an extensive network of trails. Kumeyaay living in the mountains of eastern San Diego County frequently used these trails to travel down to the Kamia settlement of *Xatopet* on the east/west portion of the Alamo River to trade and socialize in winter (Castetter and Bell 1951; Gifford 1918:168; Spier 1923:300; Woods 1982).

Kamia

The Kamia lived to the east of the Project site in an area that included Mexicali and bordered the Salton Sea. The traditional territory of the Kamia included the southern Imperial Valley from the latitude of the southern half of the Salton Sea to well below what is now the United States—Mexico international border (Forbes 1965; Luomala 1978:593). The Kamia tribe of Indigenous Peoples of the Americas live at the northern border of Baja California in Mexico and the southern border of California in the United States. Their main settlements were along the New and Alamo Rivers (Gifford 1931). Their Kumeyaay language belongs to the Yuman—Cochimí language family.

Subsistence of the Kamia consisted of hunting and gathering and floodplain horticulture (Barker 1976; Gifford 1931). In normal years, the Colorado River would overflow its banks in the spring and early summer and fill rivers such as the New and Alamo. When the floodwaters receded, the Kamia would plant in the mud. A dam was maintained at *Xatopet* on the east/west portion of the Alamo River to control water flow and allow farming in years when water flow was insufficient (Castetter and Bell 1951:43). Gifford (1931:22) and Castetter and Bell (1951:43) suggested these were recent adaptations and not traditional life ways. Bean and Lawton (1973); Lawton and Bean (1968), and Shipek (1988) argue that irrigation was indigenous.

The Kamia's major food staple was mesquite and screwbean, called by the Kamia *anxi* and *iyix*, respectively (Gifford 1931:23), along with the seeds of the ironwood (*Olneya tesota*), also known as *palo fierro* in Spanish, and palo verde were also used. Neither palo verde nor ironwood was considered a particularly desirable food resource (Castetter and Bell 1951:195-196). Acorns, also an important seasonal food, were gathered in the mountains to the west of Kamia territory in October and acquired through trade from the southern Kumeyaay (Gifford 1931).

Hunting contributed to the diet in a minor way in terms of overall caloric intake but provided valuable protein and skin and bone for clothing, blankets, and tools. Small game, primarily rabbits, was most frequently taken, using bow and arrow or rabbit stick (*macana*). Sometimes fires were set along sloughs to drive rabbits out. Individuals with bow and arrow also hunted deer and mountain sheep. Fish were also taken in sloughs with bow and arrow and by hand, hooks, basketry scoops, and seine nets (Gifford 1931:24).

Colorado River Indian Tribes

The population of the CRIT reservation comprises people from the Mojave, Chemehuevi, Hopi, and Navajo. While the Hopi and Navajo were forced into the reservation from further east, both the Mojave and Chemehuevi have been in this region since the tribe split off from the Southern Paiute in the area of current-day Las Vegas (Bean and Vane 2002). Although the origins of the Chemehuevi are of the Southern Paiute, their culture has been heavily influenced by the Mojave (Deur and Confer 2012), testifying to the close relationship between the two tribes. Relationships between the Chemehuevi and the Mojave have not always been peaceful; however, the Mojave retained the rights to travel through the newly established Chemehuevi territory (Bean and Vane 2002).

The subsistence pattern of the Chemehuevi was agriculturally based. Maize, squash, melons, gourds, beans, cowpeas, winter wheat, and some grasses were key crops grown in the floodplain areas along the Colorado River. Hunting and gathering were also important elements of the subsistence strategy undertaken by younger adults while the elderly stayed in the village to tend to the crops (Deur and Confer 2012).

Spiritually, the Chemehuevi were tied to their land, with spiritual power coming from particular landmarks within their territory such as mountain peaks, caves, or springs. Puha trails link the landmarks together and are also considered to have spiritual power (Deur and Confer 2012). The manner in which ceremonies were practiced showed the tribe's close ties with the Mojave. Hunting and gathering traditions followed the traditional Paiute pattern, as did burial practices. Other ceremonial practices testify to the Mojave influence (Deur and Confer 2012).

Mojave were also agrarian and had a reliance on fishing in the Colorado River. It should be noted that the Chemehuevi deferred fishing rights to the Mojave (Deur and Confer 2012). The Mojave people during the protohistoric and historic times were semi-sedentary. Floodplain farming was common, and the Colorado River made up the center of their territory. The extent of their territory extended on either side of the Colorado River to the east as far as the highest crest of the Black Mountains, the Buck Mountains, and the Mojave Mountains and to the west to the Sacramento, Dead, and Newberry Mountains. From north to south their territory ran from the Mohave Valley to south of what is now the City of Blythe (Bean and Vane 2002).

The Mojave peoples were nationalistic, considering their home territory to be their own country (Deur and Confer 2012). Frequently warring with the Halchidoma, the Mojave and Quechan joined forces to evict the Halchidoma from their territory. The Mojave then encouraged the Chemehuevi to move into the river area (Russell et al. 2002). Trade was of particular importance to the Mojave, who had extensive trail networks to take them to the Pacific Coast in the west, and to the Cahuilla in the south and east (Bean and Vane 2002).

In the spring and summer months the Mojave lived along the banks of the Colorado River where they harvested crops and fished for sustenance. Crops were planted in the spring as the river, swollen from the winter rains, receded. Seeds were planted in the newly exposed and saturated mud. While the Mojave peoples relied on their crops, their major food staple was mesquite and screwbean pods, which were gathered. In the winter they moved their settlement areas to rises above the river to avoid seasonal flooding (Russell et al. 2002).

2.2.3 History

The first significant European settlement of California began during the Spanish Period (1769 to 1821) when 21 missions and four presidios were established between San Diego and Sonoma. Although located primarily along the coast, the missions dominated economic and political life over the greater California region. The purpose of the missions was primarily for political control and forced assimilation of the Native American population into Spanish society and Catholicism, along with economic support to the presidios (Castillo 1978).

In the 1700s, due to pressures from other colonizers (Russians, French, British), New Spain decided that a party should be sent north with the idea of founding both military presidios and religious missions in Alta California to secure Spain's hold on its lands. The aim of the party was twofold. The first was the establishment of presidios, which would give Spain a military presence within its lands. The second was the establishment of a chain of missions along the coast slightly inland, with the aim of Christianizing the native population. By converting the native Californians, they could be counted as Spanish subjects, thereby bolstering the colonial population within a relatively short time (Lech 2012: 3-4).

The party was led by Gaspar de Portolá and consisted of two groups: one would take an overland route, and one would go by sea. All parties were to converge on San Diego, which would be the starting point for the chain of Spanish colonies. What became known as the Portolá Expedition set out on March 24, 1769. Portolá, who was very loyal to the crown and understood the gravity of his charge, arrived in what would become San Diego on July 1, 1769. Here, he immediately founded the presidio of San Diego. Leaving one group in the southern part of Alta California, Portolá took a smaller group and began heading north to his ultimate destination of Monterey Bay. Continuing up the coast, Portolá established Monterey Bay as a Spanish possession on June 3, 1770, although it would take two expeditions to accomplish this task.

Having established the presidios at San Diego and Monterey, Portolá returned to Mexico. During the first four years of Spanish presence in Alta California, Father Junípero Serra, a member of the Portolá expedition and the Catholic leader of the new province, began establishing what would become a chain of 21 coastal missions in California. The first, founded concurrently at San Diego with the presidio, was the launching point for this group. During this time, four additional missions (San Carlos Borromeo de Carmelo, San Antonio de Padua, San Gabriel Arcángel, and San Luis Obispo de Tolosa) were established (Lech 2012: 1-4).

The Mexican Period (1821-1848) began with the success of the Mexican Revolution in 1821, but changes to the mission system were slow to follow. When secularization of the missions occurred in the 1830s, the missions' vast land holdings in California were divided into large land grants called ranchos. The Mexican government granted ranchos throughout California to Spanish and Hispanic soldiers and settlers (Castillo 1978; Cleland 1941). Even after the decree of secularization was issued in 1833 by the Mexican Congress, missionaries continued to operate a small diocesan church. In 1834, the San Gabriel Mission, including over 16,000 head of cattle, was turned over to the civil administrator.

In 1848, the Treaty of Guadalupe Hidalgo ended the Mexican American War and marked the beginning of the American Period (1848 to present). The discovery of gold that same year sparked the 1849 California Gold Rush, bringing thousands of miners and other new immigrants to California from various parts of the United States, most of whom settled in the northern part of the state. For those settlers who chose to come to southern California, much of their economic prosperity was fueled by cattle ranching rather than by gold. This prosperity, however, came to a halt in the 1860s because of severe floods and droughts, as well as legal disputes over land boundaries, which put many ranchos into bankruptcy.

Imperial County was formed in 1907 from a portion of San Diego County known as Imperial Valley and is the newest of California's counties. It is known for being one of California's most prosperous agricultural communities because of its vast canal systems stemming from the Colorado River. The first diversion of the Colorado River was in 1905 and continued through 1942 when the All-American Canal was completed. It is this water, conveyed from the Colorado River, that makes Imperial County so rich (Hoover et al. 2002).

City of Brawley

Just as the Imperial Valley was starting to develop, a circular was released by the U.S. Government in 1902 claiming nothing would grow in this desert area, even with plentiful water. This now famous "libel" changed the name of Brawley, which was initially slated to be called Braly. A man named J.H. Braly from Los Angeles had underwritten shares of water stock and was assigned 4,000 acres of land at the center of the site where Brawley now stands. When Braly read this circular, he appealed to the Imperial Land Company to be released from his bargain. They told him they expected to build a city on his land and call it Braly. However, J.H. Braly wanted no part of it; he did not want his name connected with what he envisioned as a failure. George E. Carter, who was building the grade for the new railroad, heard of Braly's wish and took over Braly's contract for the 4000 acres (City of Brawley 2020).

The Imperial Land Company got wind of the deal and sent emissaries to Carter, who sold out. Meanwhile, A.H. Heber (a principal in the townsite organizing company) had a friend in Chicago by the name of Brawley and suggested the town be called that name. The company ordered the new town platted in October of 1902. Brawley had a petition signed and was ready to incorporate in June 1907 but deferred the matter until the new Imperial County was formed out of a portion of San Diego County that year. Then

in February 1908, a petition was filed, and Brawley was allowed to call an election. The vote was 34 to 22 in favor of incorporation (City of Brawley 2020).

For more than a century, Brawley has remained close to its roots of being a small, agricultural community. Many of its businesses cater to area farmers and ranchers who also call Brawley home. From the beginning, those who believed in Brawley were successful in creating imaginative ways to develop an oasis in what was once a hostile environment. Now as then, the town folk of Brawley pull together to create a united vision that is attractive to visitors, homeowners, consumers, developers and businesspeople alike. Incorporated in 1908, was a "tent city" of only 100 persons who were involved in railroads and the earliest introduction of agriculture. It had a population of 11,922 in 1950, but population growth was slow from the 1960s to the early 1990s (City of Brawley 2020).

SECTION 3.0 – RESEARCH DESIGN

3.1 PALEONTOLOGICAL RESOURCES

Chambers Group conducted a desktop review that included a review of published and unpublished paleontological literature and a search of museum records obtained by the San Diego Natural History Museum (SDNHM; McComas 2020; [Confidential Appendix A]). Using the results of the literature review and records search, Chambers Group evaluated the paleontological resource potential of the geologic units underlying the Project site. A field survey was conducted for the geologic units identified as highly sensitive to assist in determining where paleontological monitoring may be necessary during Project implementation.

Determining the probability that a given project site might yield paleontological resources requires a knowledge of the geology and stratigraphy of the project site, as well as researching any nearby fossil finds by: (1) reviewing published and unpublished maps and reports; (2) consulting online databases; (3) seeking any information regarding pertinent paleontological localities from local and regional museum repositories, and (4) if needed, conducting a reconnaissance site visit or paleontological resources field survey.

The University of California Museum of Paleontology (UCMP) online paleontological database was used to search for previously recorded paleontological localities in the Project vicinity (November 2020). Only a single right dentary fragment from a Camelidae species was found near Coachella in 1953 (V5303). In addition, Chambers Group obtained paleontological record search data from the San Diego Natural History Museum (SDNHM) on October 07, 2020 (McComas 2020). The SDNHM determined that the proposed Project has the potential to impact late Pleistocene to Holocene-age Lake Cahuilla Beds. Eight recorded fossil localities have been recorded by the SDNHM within a 1-mile radius of the Project site including three localities that were recovered during paleontological monitoring of excavations at the borrow pit for the California Department of Transportation (Caltrans) Brawley Bypass project located along the west side of the proposed Project (McComas 2020). These discoveries include fragments of petrified wood, foraminiferal tests, shells of freshwater snails, mussels, pea clams, and ostracods, as well as bones and teeth of freshwater bony fish, a phalanx (toe bone) of an amphibian, and isolated postcranial remains of unidentified rodents, canids, and felids.

3.2 CULTURAL RESOURCES

A records search dated October 14, 2020, was obtained from the South Coastal Information Center (SCIC) at San Diego State University (Confidential Appendix A). The records search provided information on all documented cultural resources and previous archaeological investigations within the 1-mile record search radius. Resources consulted during the records search conducted by the SCIC included the NRHP, California Historical Landmarks, California Points of Historical Interest, and the CRHR Inventory. Results of the records search and additional research are detailed below.

3.2.1 Reports within the Study Area

Based upon the records search conducted by the SCIC, 14 cultural resource studies have previously been completed within the 1-mile records search radius. Of the 14 previous studies, 9 of these studies were within the current Project site and are shown in bold (Table 1).

		Table 1: Previous Cultur	ral Resources Studies within the Study Area	
Report Number	Year	Author	Title*	Resource
IM-00079	1976	Von Werlhof, Jay, and Sherilee Von Werlhof	Archaeological examinations of certain geothermal test well sites near Brawley.	N/A
IM-00095	1977	Von Werlhof, Jay, and Sherilee Von Werlhof	Archaeological examinations of five (5) geothermal test well sites near Brawley.	N/A
IM-00146	1978	Von Werlhof, Jay and Sherilee Von Werlhof	Archaeological examinations of a proposed geothermal test area near Brawley.	N/A
IM-00476	1993	Singer, Clay A., John Atwood, and Shelley Marie Gomes	Cultural Resource Records Search for Southern California Gas Company Line 6902 South Imperial County, California.	N/A
IM-00602	1996	Von Werlhof, Jay	Archaeological examination of the Davis Material Site: Reclamation Plan #177-95-COP #1187-95.	N/A
IM-00657	1998	Crafts, Karen C.	Negative Archaeological survey report for the proposed widening of shoulders on State Route 111 in Imperial County between the cities of Brawley and Calipatria.	N/A
IM-00671	1999	Crafts, Karen C.	Historic Property Survey for State Route 78/111 Brawley Bypass.	N/A
IM-00692	1998	Crafts, Karen	Historic Property Survey Report-Negative Findings-Widening the shoulders on State Route 111 in Imperial County between the cities of Brawley and Calipatria.	N/A
IM-00834	1998	Crafts, Karen C.	Negative Archaeological Survey Report for the Construction of the State Route 78/111 Brawley Bypass.	N/A
IM-00835	1989	Fisher, Jim	Historic Architectural Survey report for the Brawley bypass Imperial County.	N/A
IM-00913	2003	Perry, Laureen M.	An Intensive Cultural Resources Inventory of 30 acres for the Brawley Wastewater Treatment Wetlands Pilot Project in Brawley, Imperial County, California	N/A
IM-01149	1999	Eckhardt, William T.	Archaeological Constraints Report for the proposed expansion of Brawley Wastewater Treatment Plant.	N/A
IM-01158	1996	Archaeological Consulting Services, LTD.	An Archaeological Assessment of the Niland- Imperial Pipeline Expansion Corridor, Imperial County, California.	13- 005951
IM-01228	2006	SWCA Environmental Consultants	Volume 1- Cultural Resources Final Report of Monitoring and Findings for the QWEST Network Construction Project, State of California.	N/A

3.2.2 Previously Recorded Cultural Resources within the Study Area

Based upon the records search conducted by the SCIC, five previously recorded cultural resources were recorded within the 1-mile record search radius. Results show that none of the previously recorded resources are mapped within the Project site boundaries (Table 2).

Table 2: Previously Recorded Cultural Resources within the Study Area						
Primary Number	Trinomial	Age	Site Description	Inside Project Site Boundaries	Relocated	
P-13-00880	CA-IMP-00880	Prehistoric	Indian Trail N.W & S.E.	Outside	N/A	
P-13-02409	CA-IMP-02409	Prehistoric	Small ceramic kiln site	Outside	N/A	
P-13-07993	CA-IMP-07993	Historic	Moderate-size farm complex	Outside	N/A	
P-13-07994	CA-IMP-07994	Historic	Single-story rectangular structure	Outside	N/A	
P-13-08682	CA-IMP-08166H	Historic	Portion of the Niland to Calexico Railroad	Outside	Yes	

3.2.3 Native American Heritage Commission

Sacred Lands File Search

Chambers Group submitted a request for a search of the Sacred Lands Files (SLF) housed at the California Native American Heritage Commission (NAHC) on October 2, 2020. The results of the search were returned on October 28, 2020, and were positive. The NAHC response provided contact information for the 18 tribes that may have information on cultural resources on the Project site.

Letters requesting information were sent via certified mail on October 19, 2020. Emails were also sent to the contacts in an effort to elicit a quicker response. As of February 1, 2020, the Viejas Band of Kumeyaay Indians has requested to be involved with monitoring efforts. Consultation and communications are ongoing with San Pasqual Band of Mission Indians, who have also requested to be involved as the Project progresses. The Agua Caliente Band of Cahuilla Indians declined involvement and defers to the other tribes in the area. Communication with the remaining 15 tribes is ongoing.

SECTION 4.0 – FIELD METHODS

Survey of the Project site took place over the course of November 2 and 5, 2020, and included Chambers Group archaeologists Kellie Kandybowicz, B.A., Sarah Roebel, B.A., and paleontologist Niranjala Kottachchi, M.A. The Project site was surveyed at 15-meter intervals, and crews were equipped with submeter accurate Global Positioning Systems (GPS) units for recording spatial data and to document the survey area and all findings through ArcGIS Collector and Survey 123. The purpose of the field survey was to visually inspect the ground surface for both paleontological and archaeologically significant materials. No geographic obstructions or impediments were present, and the crew was able to survey the Project site in its entirety. Much of the proposed Project survey area was vegetated by agricultural fields (Figure 4) while others were in areas previously disturbed for emplacement of water channels and culverts for agricultural purposes. In agricultural fields on the eastern side of the Project area, visibility ranged from 10 percent to 90 percent; the remainder of the Project area had 100 percent visibility.

The paleontologist examined the surface soils, assessed for exposed fossils, and evaluated the stratigraphy for its potential to contain preserved paleontological resources. The survey focused on areas underlain by ancient Lake Cahuilla Beds previously interpreted to have a high sensitivity to produce paleontological resources. Sediment approximately 2 inches below the surface was examined to determine the geologic unit (s) present. Active drainages exposing the subsurface deposits were visually scanned for paleontological resources. Notes were taken on the geology and lithology of the geologic unit(s), and photographs were taken to document the survey (Figures 2 and 3).

The archaeologists assessed the ground surface for prehistoric artifacts (e.g., flaked stone tools, tool-making debris, stone milling tools), historic-period artifacts (e.g., metal, glass, ceramics), and sediment discoloration that might indicate the presence of a cultural midden, as well as depressions and other features indicative of the former presence of structures or buildings (e.g., post holes, foundations). When an artifact or feature was observed during survey, the GPS data were recorded using the ArcGIS Collector application; photographs and measurements were taken; and, when applicable, for historic glass artifacts, the maker's marks and date codes were recorded for further analysis and post-processing.

SECTION 5.0 – RESULTS

5.1 RESULTS OF PALEONTOLOGICAL SURVEY

Late Pleistocene to Holocene Lake Cahuilla deposits exposed and/or underlying the proposed Project area consist of dark brown to gray, silty clays interpreted as freshwater lacustrine; and, in drainages where exposed, these same sediments are interbedded with finer to medium sands containing pebbles. The latter indicates the influence of fluvial action within the environment.

No paleontological resources were discovered during the survey within exposed cuts. Numerous bivalves and gastropods were, however, identified on the surface in exposed sediments around the perimeter of agricultural fields. These finds were in silty clays resembling Lake Cahuilla Beds, but it is uncertain as to what depth these finds came from. They appear to be in sediments that may have been disturbed during previous excavations for the emplacement of canals and water drainages.

5.2 RESULTS OF ARCHAEOLOGICAL SURVEY

Archival records search, background studies, and intensive pedestrian survey of the Project site were conducted as part of a Phase I cultural resource study. The NAHC Sacred Lands File search returned a positive result. A records search request was submitted to the SCIC at San Diego State University, San Diego, October 5, 2020. The records search results (Confidential Appendix A) were received on October 22, 2020 The results indicate that five previously recorded resources have been identified within a 1-mile radius of the Project site; none are mapped within the Project site boundaries. These results are summarized in Table 2 above. In addition, 14 cultural resources studies have been conducted in the vicinity, with 9 being within the Project site (Table 1).

During completion of the survey, resource CA-IMP-08166H was relocated. Although not mapped within the actual Project site boundaries, a segment of CA-IMP-8166H was relocated due to its bisecting position between the two adjacent Project areas. Additionally, six newly recorded historic-period resources were identified (Table 3). The new historic-period resources were fully documented with the appropriate DPR 523 series forms for each of the new resources and will be submitted to the SCIC for inclusion in the archaeological database (Confidential Appendix B). These six historic-period sites will be assigned primary numbers by the SCIC (pending). A description of the new finds follows.

Table 3: Newly Identified Cultural Resources Within Project Site						
Resource Name (Temporary)	Trinomial Number	Date Recorded	Age	Description	Recommended Evaluation	
21267-001	Pending	November 2, 2020	Historic	Single-story residence	Recommended not eligible	
21267-002	Pending	November 2, 2020	Historic	House/pads; glass and ceramic scatter	Not Evaluated	
21267-003 (Iso)	Pending	November 3, 2020	Historic	Green glass bottle base	Not Evaluated	
21267-004	Pending	November 5, 2020	Multi-component	Glass bottle, sanitary and food can scatter	Not Evaluated	

Table 3: Newly Identified Cultural Resources Within Project Site						
Resource Name (Temporary)	Trinomial Number	Date Recorded	Age	Description	Recommended Evaluation	
21267-005	Pending	November 5, 2020	Multi-component	Historic glass bottle, sanitary and food can scatter; modern refuse	Not Evaluated	
21267-006	Pending	November 5, 2020	Historic	Canals / water conveyance, part of irrigation district	Not Evaluated	

21267-001

21267-001 is a historic farm/ranch complex, including a single-story house, numerous miscellaneous outbuildings, and a fenced area on the east side of the property. The farm/ranch is located at 5003 Best Road, Brawley, CA 92227, at the northwest corner of Best Road and Ward Road, which runs parallel to the east-west Livesley Drain. The complex is in the southeasternmost location within the Project site boundaries and is bordered to the north and northwest by agricultural fields. The complex is visible as early as 1945 on the USGS map and 1953 in aerial imagery (NETR Online 2020). The house and associated structures are still present. The building appears to correspond to typical minimal traditional style of form and construction, resting on a perimeter foundation of poorly consolidated concrete made with local materials. Wood joists are noted in the interior where exposed, suggesting a post-and-pier foundation for the floor of the building. The outline is a simple rectangle with a low, gabled roofline and minimal pitch. Roof eaves minimally extend, with boxed in soffits. The exterior is treated in stucco, using techniques typical of the period; tarpaper wrap, with wire mesh, a brown/scratch coat, and a finish coat. There are several wood-trimmed piercings for wood-cased double-sash windows. Cast-iron waste pipes are embedded into the exterior surface along one wall.

Several outbuildings are present, but their function remains unknown at this time. These are wood-framed and sided, and most are in a state of collapse or disrepair. Construction techniques and the greater fullness of the dimensions of the dimensional lumber suggest that these buildings are contemporaneous with the main residential building.

The 5003 Best Road residence was evaluated in March 2021 by Chambers Group based on the criteria for listing in the CRHR and was recommended not eligible (Appendix C).

21267-002

21267-002 is the location of a formerly standing historic-era residential house, consisting of one remaining outbuilding foundation, two cement slabs (likely driveways), and historic debris, which includes ceramics and glass bottle fragments. The remaining components of the house and associated features are located immediately adjacent to and west of Best Road and the Best Canal; this is also the eastern entrance from Best Road to the City of Brawley Wastewater Treatment Plant. The perimeter foundation is constructed from concrete and contains inserted lag-bolts to secure the sill-plate of the building. This feature is a requirement following the 1933 Long Beach earthquake and was promulgated into the California building code in the 1930s. The foundation measures 208 inches in length, 111 inches in width, and has a height

of approximately 37 inches. The two concrete slab measurements range from 21 to 40 feet in length, are both 16 feet in width, and have a height of 5 inches. The glass fragments were predominately nondiagnostic; however, the presence of a patinated manganese glass fragment and a hobbleskirt design of what appears to be a Georgia-green-colored Coca-Cola bottle are dated to roughly the 1880s to the 1950s (Toulouse 1971). Also observed were two Japanese blue on white porcelain ceramic fragments, likely from a saucer and a bowl or cup (Figure 5). The house and associated features are visible as early as 1945 on the USGS map and 1953 in aerial imagery and is no longer present on the 1974 USGS map but visible in aerial imagery until 2012 (NETR Online 2020).

21267-I-003

21267-I-003 is an isolated green glass bottle base with an Anchor-Hocking maker's mark dating to 1971 (Toulouse 1971). The glass base was located on the north side of a graded pad in a highly disturbed area, which is due to previous construction and continuous vehicle traffic around the irrigation systems and wastewater treatment plant. The isolate was likely redeposited when the pad and water basin were constructed sometime between 2010 and 2012. The isolated artifact could possibly have been separated from historic trash deposit site 21267-004, which is located 450 feet to the east/southeast.

21267-004

21267-004 is an overlapping deposit site with two distinct periods of deposition. An early deposit is evidenced by the presence of manganese-clarified glass, which has since taken on its characteristic purple color due to absorption of ultraviolet solar radiation. Bottle types appear to consist of pepper sauce and/or liniment types and exhibit characteristics of being manufactured before the complete adoption of the automatic bottle machine. This is evidenced by the presence of hand-applied and tooled finishes. This manufacturing feature roughly dates between 1880 and 1918 but is likely to date before 1903, at which time the automatic bottle machine was put into commercial production. The overlaying historic-period deposit consists of common consumer goods such as liquor bottles, a bimetallic beer can, a condensed milk can, an oval fillet can, and a possible quart oil can, along with a bundle of wire mesh fence material, a variety of shot casings, and two cobble hearth features. Identified bottle maker's marks include Latchford-Marble Glass that dates to between 1938 and 1956, an Owens-Illinois mark dated 1940, Gallo Flavor Guard dating between 1933 and 1964, and a Roma Wines mark dating between the 1950s and early 1970s (SHA 2021). A bimetallic beer can with pull tab opening dates to the early 1960s, and the matchstick filler condensed milk can measuring 2 ⁸/₁₆ inches by 2 ⁵/₁₆ inches corresponds to Simonis' type 20, which dates between 1950 and 1985 (Simonis 1997). Also present are a number of shot casings with headstamps relating to Activ, Remington, and Clever manufacturers. Activ Corporation of Kearneysville, West Virginia, produced a plastic hulled shell from the 1970s through the late 1990s. Clever has produced shot shells since 1952. Remington began manufacturing plastic shot shells in 1960, with Peters shells being produced in their characteristic blue color until the late 1960s (Standler 2006). Also noted in association with these deposits are two cobble hearth features with extant charcoal fragments. Based on this data it is suggested that the earlier component of the deposit may be related to railroad construction or maintenance, while the later component may be related to the expansion of post-war leisure time expansion and sport hunting activities.

21267-005

21267-005 is a historic-era site with deposits dating between the 1920s and the 1950s. The trash scatter consists of matchstick filler and sanitary cans, glass bottles and jars, 12- and 16-ounce beverage (beer)

cans, and a variety of unidentified burned fragments. The deposit is located west of railroad tracks, north of the proposed Project tie-line, on the bank along New River. The areas to the east and south of the site are disturbed by the installation of the aboveground water conveyance and the wastewater treatment plant. Identified items observed include a small pill bottle with screw-top finish, a bottle with a maker's mark suggesting a C in a circle design, perhaps representative of the Chattanooga Glass Company of Chattanooga, Tennessee, whose mark was used between approximately 1927 and 1988, a bottle fragment with an Owens-Illinois mark and date code of 1940, and a bottle base with Latchford-Marble Glass mark that dates to between 1938 and 1956. Also noted was a 12-ounce bimetallic beverage (beer) can dating between 1960 and 1975 and a 16-ounce all-metal beverage (beer) can that predates 1975, a church keyopened sanitary can that postdates 1935, and several matchstick filler condensed milk cans whose measurements are unclear at this time. In addition, several fragments of saw-cut bone, both bleached, and burned, were scattered throughout the deposit.

21267-006

21267-006 is a concrete, linear water conveyance element of the irrigation district. The irrigation system runs east-west along Andre Road between Hovley Road on the west to the wastewater facility tie-in on the east (west of Best Road).

The tie-line corridor is paralleled by the Spruce No. 3 Lateral and the Spruce No. 3 Drain. Both of these features of the early irrigation network course through the tie-line corridor. The Spruce 3 Lateral is supplied by the Smilax Lateral, which draws water from the north-south running Spruce Main Canal, which is supplied by the West Side Main Canal. As the Spruce 3 Lateral and Drain travel easterly along Andre Road, both alignments jog north-northeasterly approximately 16 meters (50 feet), midway between Hovley Road and State Route (Highway) 111, and continue their easterly trajectory, where Spruce 3 Lateral continues to supply lands to the north. Spruce 3 Drain terminates at the New River.

The Spruce line of irrigation canals, laterals, and drains was established by the Irrigation District Water Company No. 8 in the early 1900s. The alignments are noted on the Thurston map of 1914 and are indicated on a series of 7.5-minute USGS topographic quadrangles in the same format and arrangement.

The Spruce No. 3 Lateral is concrete-lined and controlled by a series of gates and turnouts (Figure 7). The main channel is composed of formed-in-place concrete with walls opened outward approximately 30 degrees from vertical. The width of the lateral is approximately 8 feet at the top, with a depth of approximately 4 feet. Approximately 0.5 mile east of Hovley Road the alignment of the lateral shifts north approximately 50 feet, with a turnout gate directing water underground, where it returns to the surface in the alignment to the north, continuing easterly towards Highway 111, where it undercrosses the roadway and continues to supply the fields to the north until it reaches the New River. Date stamps on turnouts and head gates indicate that these features were added between the middle 1950s to the middle 1970s. Turnout gate 75, located near North Western Avenue, is dated to 1956 as is the head gate, while the adjacent upstream underground culvert frame is dated to 1963. Turnout gate 76 is dated to 1974. The head gate near Hovley Road is a jack type with a ferrous rod and jack assembly controlling a wooden gate located in tracks inset into the concrete lateral. The jack rests on a wood crossbeam set atop concrete pillars that rest on the sidewall of either side of the lateral. All turnout gates appear to be nonferrous metal slide gates that are controlled by dowling pins inserted into the perforated gate post, with the dowling pin resting on two wood beams affixed to the concrete pillars straddling either side of the gate opening.

The Spruce No. 3 Drain parallels the No. 3 Lateral and is offset approximately 30 feet to the south. The No. 3 Drain, as with nearly all drains in the system, was designed and constructed with an eye toward utility and function. The alignment is directly cut into the ground with spoils used to create elevated roadways along the margins. Width of the drain varies but is roughly 30 feet wide, with sidewalls sloping approximately 30 degrees from vertical. The drain has been subject to continual routine maintenance activities since its initial construction, with removed sediments relocated on the roadbeds adjacent. Approximately 0.5 mile east of Hovley Road, the alignment of the drain shifts north approximately 50 feet, continues eastward, undercrossing Highway 111, and terminates at the New River, where excess water is drained.

While the irrigation network is considered an historic resource, individual elements such as laterals and drains are ubiquitous and often are a result of relining efforts to control water loss beginning in the 1950s, obliterating the original dirt canal systems. Similarly, drains are under constant maintenance and restructuring to maintain shape, form, and water flow through removal of vegetation and sediments (Shultz 2017). As such, both the Spruce No. 3 Lateral and the Spruce No. 3 Drain are not recommended eligible for inclusion on the NRHP or in the CRHR.

CA-IMP-8166H

CA-IMP-8166H is the Niland to Calexico Railroad, which was constructed between 1902 and 1904 by the Southern Pacific Company and runs 65 miles from Niland to Calexico. The resource was recorded in 2003 by Collins and Pflaum as a standard gauge track on a gravel base and is still in use today (Ehringer 2011).

A portion of the Niland to Calexico Railroad was revisited and updated as part of the current survey of the Project area, which is bisected by the railroad in a north-south direction, between an unnamed dirt road, west of Best Canal turn-out number 116 in the north, and the Livesley Drain in the south. Five undercrossing features were identified within the Project area crosspassing under the existing railroad line. These features are constructed of poured-in-place, board-formed concrete with head wall and wingwalls either side to form a revetment-style retainer for the track ballast; and areas are constructed of cement and mortar and allow feeder lines from Best Canal, which is to the east of the railroad, to supply water to the adjacent agricultural lands. The feeder line undercrossing construction dates range from 1928 to 1930 (Figure 6). The wall measurements range from approximately 36 to 96 inches in height and average between 8 to 12 inches in width. The dates of construction are stamped into the sides of the main walls.

Feature 1: Two parallel feeder lines are immediately south of the intersection of the railroad and an unnamed dirt road, west of Best Canal turn-out number 116. The undercrossings, both dating to 1930, with the southern line turning slightly southwesterly on the west side of the tracks, are located at the northern end of the Project area.

Feature 2: This is an undercrossing at the intersection of the railroad and an unnamed dirt road, west of Best Canal turn-out number 115, which dates to 1928.

Feature 3: This is an undercrossing at the intersection of the railroad and an unnamed dirt road, west of Best Canal turn-out number 114, which dates to 1930.

Feature 4: This is a southwesterly undercrossing offshoot stemming from and immediately south of the feeder line for Feature 3, which is west of Best Canal turn-out number 114 and dates to 1930.

Feature 5: This is the southernmost undercrossing at the intersection of the railroad and an unnamed dirt road, west of Best Canal turn-out number 110, which dates to 1930.

SECTION 6.0 – SUMMARY AND RECOMMENDATIONS

6.1 SUMMARY

Chambers Group conducted paleontological and archaeological investigations within the Project site in November 2020. The work was performed under Chambers Group's contract with Imperial County Planning and Development Services Department. The main goal of the investigations was to gather and analyze information needed to determine if the Project, as currently proposed, would impact paleontological and cultural resources.

The SDNHM determined that the proposed Project has the potential to impact late Pleistocene to Holocene-age Lake Cahuilla Beds. Eight recorded fossil localities have been identified within a 1-mile radius of the Project site with none being located inside the Project area.

Archival record searches, background studies, and an intensive pedestrian survey of the Project site were conducted as part of a Phase I cultural resource study. The cultural record search identified nine cultural resource studies and one archaeological resource within the Project site.

The survey yielded six new historic-period and multi-component resources (21267-001, 21267-002, 21267-I-003, 21267-004, 21267-005, and 21267-006) within the Project site; a segment of the previously recorded resource, CA-IMP-8166H, was relocated and updated. One of the two farmhouses and associated structures, 21267-001, is still standing and has been evaluated for CRHR eligibility and has been recommended not eligible; what remains of the other, 21267-002, comprises a foundation, two cement slabs, and a small glass and ceramic scatter. Isolate 21267-I-003, a single green glass bottle base, was likely redeposited during the construction of the graded pad and retention basin southeast of the City of Brawley Wastewater Treatment Plant, possibly stemming from one of the two historic scatters which are located in relatively close proximity. Site 21267-004 is multi-component with a small glass and can scatter dating to the 1930s as well as 1970s and is located immediately west of the Niland to Calexico Railroad (CA-IMP-8166H) at the south end of the Project area. Site 21267-005 is multi-component with the first trash scatter dating from the early to mid-1950s and the second dating from the last deposition date through the present. Sites 21267-004 and 21267-005 were likely deposited during the construction of the railroad, water treatment plant, and irrigation system and "revisited" during the following decades during maintenance or upkeep. The segment of CA-IMP-8166H, the Niland to Calexico Railroad, which bisects the two adjacent Project areas from north to south, was revisited and relocated; updates were made to the resource by recording five cement and mortar undercrossing feeder lines from Best Canal dating to 1928 and 1930.

6.2 RECOMMENDATIONS

6.2.1 <u>Paleontological</u>

Prior to construction activity, a Qualified Paleontologist should prepare a Paleontological Resource Mitigation Plan (PRMP) to be implemented during ground-disturbance activity for the proposed Project. This program should outline the procedures for paleontological monitoring including extent and duration, protocols for salvage and preparation of fossils, and the requirements for a final mitigation and monitoring report. A qualified and trained paleontological monitor will be present on site to observe all earth-disturbing activities in previously undisturbed geologic deposits determined to have a high paleontological sensitivity (i.e., Lake Cahuilla Beds). Monitoring will consist of the visual inspection of excavated or graded

areas and trench sidewalls. Screening of sedimentary matrix should be conducted as some invertebrates may not be visible to the naked eye.

The site does have paleontological sensitivity, with high potential for paleontological resource discovery; therefore, it is recommended that a qualified paleontologist is retained and is on site for construction monitoring. These requirements are outlined in the proposed mitigation measures below.

6.2.2 <u>Cultural</u>

The records search and archaeological survey resulted in the identification of 12 resources within 1 mile of the Project site. Six new sites were identified and recorded within the Project site during the survey. One of the previously recorded resources identified in close proximity to the Project site during the records search bisects two adjacent Project areas and was relocated; this record will also be updated.

Based on the background research and results of the survey, it is not recommended that any further archaeological testing or evaluation occur, apart from resource 21267-001 which was evaluated in March 2021 by Chambers Group, for any of the above listed archaeological sites prior to construction.

Prior to permitting ground-disturbing work within the Project site, it is recommended that the County consult with the Viejas Band of Kumeyaay Indians, per their request for involvement during monitoring efforts for all ground-disturbing activities, to identify any concerns they may have regarding the Project. The San Pasqual Band of Mission Indians also requested to be notified of any discoveries located during the survey, which will determine their level of involvement. No significant impacts to cultural or paleontological resources are anticipated as a result of the current undertaking if the recommendations included below are implemented.

MM PALEO-1 Once a geotechnical report has been completed for the project, a qualified paleontologist shall review the boring logs and determine how deep paleontologically sensitive formations may be across the project site. The paleontologist shall use this information along with the results of the paleontological survey to determine if paleontological monitoring is warranted. If monitoring IS warranted, a qualified paleontologist shall prepare a mitigation and monitoring plan to be implemented during project construction.

> For any areas identified as likely to impact paleontologically sensitive MM PALEO 2-6 shall be followed.

MM PALEO-2

Developer shall retain the services of a Qualified Paleontologist and require that all initial ground-disturbing work be monitored by someone trained in fossil identification in monitoring contexts. The Consultant shall provide a Supervising Paleontological Specialist and a Paleontological Monitor present at the Project construction phase kickoff meeting.

Timing/Implementation: Prior to construction. Enforcement/Monitoring: Imperial County Department of Planning and Development Services

MM PALEO-3

Prior to commencing construction activities and thus prior to any ground disturbance in the proposed Project site, the Supervising Paleontological Resources Specialist and Paleontological Resources Monitor shall conduct initial Worker Environmental Awareness Program (WEAP) training to all construction personnel, including supervisors, present at the outset of the Project construction work phase, for which the Lead Contractor and all subcontractors shall make their personnel available. This WEAP training will educate construction personnel on how to work with the monitor(s) to identify and minimize impacts to paleontological resources and maintain environmental compliance and be performed periodically for new personnel coming on to the Project as needed.

Timing/Implementation: Prior to construction. Enforcement/Monitoring: Qualified Paleontologist and Imperial County Department of Planning and Development Services

MM PALEO-4 The Contractor shall provide the Supervising Paleontological Resources Specialist with a schedule of initial potential ground-disturbing activities. A minimum of 48 hours will be provided to the Consultant of commencement of any initial ground-disturbing activities such as vegetation grubbing or clearing, grading, trenching, or mass excavation.

> As detailed in the schedule provided, a Paleontological Monitor shall be present on site at the commencement of ground-disturbing activities related to the Project. The monitor, in consultation with the Supervising Paleontologist, shall observe initial ground-disturbing activities and, as they proceed, make adjustments to the number of monitors as needed to provide adequate observation and oversight. All monitors will have stop-work authority to allow for recordation and evaluation of finds during construction. The monitor will maintain a daily record of observations to serve as an ongoing reference resource and to provide a resource for final reporting upon completion of the Project.

> The Supervising Paleontologist, Paleontological Monitor, and the Lead Contractor and subcontractors shall maintain a line of communication regarding schedule and activity such that the monitor is aware of all ground-disturbing activities in advance in order to provide appropriate oversight.

> Timing/Implementation: During construction. Enforcement/Monitoring: Qualified Paleontologist and Imperial County Department of Planning and Development Services

MM PALEO-5

If paleontological resources are discovered, construction shall be halted within 50 feet of any paleontological finds and shall not resume until a Qualified Paleontologist can determine the significance of the find and/or the find has been fully investigated, documented, and cleared.

Timing/Implementation: During construction. Enforcement/Monitoring: Qualified Paleontologist and Imperial County Department of Planning and Development Services

MM PALEO-6

At the completion of all ground-disturbing activities, the Consultant shall prepare a Paleontological Resources Monitoring Report summarizing all monitoring efforts and observations, as performed, and any and all paleontological finds.

Timing/Implementation: Post construction. Enforcement/Monitoring: Qualified Paleontologist and Imperial County Department of Planning and Development Services

MM CUL-1

Developer shall retain the services of a Qualified Archaeologist and require that all initial ground-disturbing work be monitored by someone trained in artifact and feature identification in monitoring contexts. The Consultant shall provide a Supervising Archaeological Specialist and a Paleontological Monitor present at the Project construction phase kickoff meeting.

Timing/Implementation: Prior to construction. Enforcement/Monitoring: Imperial County Department of Planning and Development Services

MM CUL-2

Prior to commencing construction activities and thus prior to any ground disturbance in the proposed Project site, the supervising Archaeological Resources Specialist and Archaeological Resources Monitor shall conduct initial Worker Environmental Awareness Program (WEAP) training to all construction personnel, including supervisors, present at the outset of the Project construction work phase, for which the Lead Contractor and all subcontractors shall make their personnel available. This WEAP training will educate construction personnel on how to work with the monitor(s) to identify and minimize impacts to paleontological resources and maintain environmental compliance and be performed periodically for new personnel coming on to the Project as needed.

Timing/Implementation: Prior to construction. Enforcement/Monitoring: Qualified Archaeologist and Imperial County Department of Planning and Development Services

MM CUL-3

In the event of the discovery of previously unidentified archaeological materials, the Contractor shall immediately cease all work activities within approximately 100 feet of the discovery. After cessation of excavation, the Contractor shall immediately contact the Imperial County Department of Planning and Development Services. Except in the case of cultural items that fall within the scope of the Native American Grave Protection and Repatriation Act, the discovery of any cultural resource within the Project area shall not be grounds for a "stop work" notice or otherwise interfere with the Project's continuation except as set forth in this paragraph. In the event of an unanticipated discovery of archaeological materials during construction, the Applicant shall retain the services of a Qualified Professional Archaeologist meeting the Secretary of the Interior's Standards for a Qualified Archaeologist to evaluate the significance of the materials prior to resuming any construction-related activities in the vicinity of the find. If the Qualified Archaeologist determines that the discovery constitutes a significant resource under CEQA and it cannot be avoided, the Applicant shall implement an archaeological data recovery program.

Timing/Implementation: During construction. Enforcement/Monitoring: Qualified Archaeologist and Imperial County Department of Planning and Development Services

MM CUL-4

The Contractor shall provide the Supervising Archaeological Resources Specialist with a schedule of initial potential ground-disturbing activities. A minimum of 48 hours will be provided to the Consultant of commencement of any initial ground-disturbing activities such as vegetation grubbing or clearing, grading, trenching, or mass excavation.

As detailed in the schedule provided, an Archaeological Monitor shall be present on site at the commencement of ground-disturbing activities related to the Project. The monitor, in consultation with the Supervising Archaeologist, shall observe initial ground-disturbing activities and, as they proceed, make adjustments to the number of monitors as needed to provide adequate observation and oversight. All monitors will have stop-work

authority to allow for recordation and evaluation of finds during construction. The monitor will maintain a daily record of observations to serve as an ongoing reference resource and to provide a resource for final reporting upon completion of the Project.

The Supervising Archaeologist, Archaeological Monitor, and the Lead Contractor and subcontractors shall maintain a line of communication regarding schedule and activity such that the monitor is aware of all ground-disturbing activities in advance in order to provide appropriate oversight.

Timing/Implementation: During construction. Enforcement/Monitoring: Qualified Archaeologist and Imperial County Department of Planning and Development Services

MM-CUL-5

If archaeological resources are discovered, construction shall be halted within 50 feet of the find and shall not resume until a Qualified Archaeologist can determine the significance of the find and/or the find has been fully investigated, documented, and cleared.

Timing/Implementation: During construction. Enforcement/Monitoring: Qualified Archaeologist and Imperial County Department of Planning and Development Services

MM-CUL-6

At the completion of all ground-disturbing activities, the Consultant shall prepare an Archaeological Resources Monitoring Report summarizing all monitoring efforts and observations, as performed, and any and all prehistoric or historic archaeological finds as well as providing follow-up reports of any finds to the South Coastal Information Center (SCIC), as required.

Timing/Implementation: During construction. Enforcement/Monitoring: Qualified Archaeologist and Imperial County Department of Planning and Development Services

HUMAN REMAINS – LEGAL REQUIREMENTS In the unlikely event that human remains are discovered during ground-disturbing activities, then the proposed Project would be subject to California Health and Safety Code 7050.5, CEQA Section 15064.5, and California Public Resources Code Section 5097.98 (NPS 1983). If human remains are found during ground-disturbing activities, State of California Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the Imperial County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. In the event of an unanticipated discovery of human remains, the Imperial County Coroner shall be notified immediately. If the human remains are determined to be prehistoric, the County Coroner shall notify the NAHC, which shall notify a most likely descendant (MLD). The MLD shall complete the inspection of the site within 48 hours of notification and may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials (NPS 1983).

SECTION 7.0 – SITE PHOTOGRAPHS



Figure 2: Gastropods & bivalves within silty clays of possible Lake Cahuilla lacustrine sediment, facing north/overview.



Figure 3: Possible exposure of Lake Cahuilla lacustrine, facing north.



Figure 4: Survey area west of Best Road, facing north.

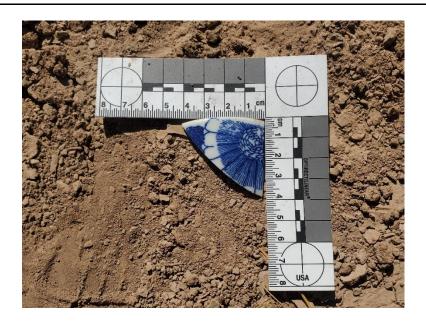


Figure 5: Historic Japanese blue on white porcelain ceramic fragment located near structure foundation at 21267-002.



Figure 6: Overview of Niland to Calexico Railroad and culvert undercrossing dated to 1930 at north end of Project area, facing southwest.



Figure 7: Overview of Spruce No. 3 Lateral, showing construction dates of 1956 and 1963, facing west/southwest. Located at the southeast corner of Hovley Road and Andre Road.

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5003 Best Road Residence CRHR Evaluation

Temporary resource number: 21267-001 (Trinomial pending)

Kellie Kandybowicz

Cultural Resource Specialist, Chambers Group Inc.

March 18, 2021

During the Phase I pedestrian survey for the Brawley Solar Project in November 2020, the historic-era farm/ranch complex at 5003 Best Road was encountered within Project boundaries. The vacant residence was evaluated in March 2021 to determine if its removal during project development would contribute to any adverse effects and significant impacts as a cultural resource. The resource assessment was conducted in compliance with the California Environmental Quality Act (CEQA) and evaluated under the criteria of the California Register of Historic Resources (CRHR; OHP 2021).

California Register of Historic Resources

A cultural resource is considered "historically significant" under CEQA if the resource meets one or more of the criteria for listing on the CRHR. The CRHR was designed to be used by state and local agencies, private groups, and citizens to identify existing cultural resources within the state and to indicate which of those resources should be protected, to the extent prudent and feasible, from substantial adverse change. The following criteria have been established for inclusion in the CRHR. A resource is considered significant if it:

- 1. is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- 2. is associated with the lives of persons important in our past;
- 3. embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
- 4. has yielded, or may be likely to yield, information important in prehistory or history.

Historical Context

Imperial County was formed in 1907 from a portion of San Diego County known as Imperial Valley and is the newest of California's counties. It is known for being one of California's most prosperous agricultural communities because of its vast canal systems stemming from the Colorado River. The first diversion of the Colorado River was in 1905 and continued through 1942 when the All-American Canal was completed. It is this water, conveyed from the Colorado River, that makes Imperial County so rich (Hoover et al. 2002).

As the Imperial Valley was starting to develop, a circular was released by the U.S. Government in 1902 claiming nothing would grow in this desert area, even with plentiful water. A man named J.H. Braly from Los Angeles had underwritten shares of water stock and was assigned 4,000 acres of land at the center of the site where Brawley now stands. George E. Carter, who was building the grade for the new railroad, heard of Braly's wish to be released from his bargain, as he envisioned the city as a potential failure, and took over Braly's contract for the 4000 acres. The Imperial Land Company got wind of the deal and sent

emissaries to buy out Carter. The company ordered the new town platted in October of 1902 (City of Brawley 2020).

Brawley was eventually incorporated in 1908 and was a "tent city" of only 100 persons who were involved in railroads and the earliest introduction of agriculture. It had a population of 11,922 in 1950, had growth that was slow from the 1960s to the early 1990s, and as of 2019, Brawley's population is 26,000. Although the town has grown substantially, for more than a century, Brawley has remained close to its roots of being an agricultural-driven community (City of Brawley 2020).

5003 Best Road Residence

The farm/ranch complex is located at 5003 Best Road, Brawley, CA 92227, at the northwest corner of Best Road and Ward Road, which runs parallel to the east-west Livesley Drain and is bordered to the north and northwest by agricultural fields. The complex is within U.S. Geological Survey (USGS) *Westmorland East*, California, 7.5-minute topographic quadrangle, Township 13 South, Range 14 East, in tract 120 and APN number 037-140-006. The property is located within the Imperial Irrigation District.

In 1908, the property on which the farm/ranch complex is located was surveyed for sale to Ms. Myrta Livesley and on April 19, 1911 a patent (No. 189395) was recorded by the General Land Office in Los Angeles, California for claimants Edward J. Standlee, Thomas A. Livesley, and William E. Miller (USDI 2021). No additional documentation was located on the early development and residents of the property or the construction of the farm/ranch structures, which includes a single-story house, numerous miscellaneous outbuildings, and a fenced area on the east side of the property. The residence is first visible on the 1945 USGS map and in 1953 aerial imagery (NETR 2020). Based on the construction style, the house was likely built circa 1935 (City of San Diego 2007).

Over the last 100 years, the land on which the complex was built has been sold multiple times. The original land title held by the aforementioned individuals, most notably Mr. Livesley, was developed for agricultural use. The property was eventually owned by the Flammang family, Loma Farms, and most recently by ORNI 19, LLC (County of Imperial 2021).

Thomas A. Livesley

Thomas A. Livesley was born to Samuel and Margaret Livesley of Wisconsin. His father was a prominent British hop grower. The sixth of ten siblings, he was born in 1863 in Ironton, Sauk County, Wisconsin during the middle of the Civil War. At the age of ten his father bought and moved the family to a ranch in nearby LaValle. In 1879, at 16 he was listed by the census as "laborer" and at 21 as a "carpenter." Thomas is said to have traveled west with John Morrison in 1885 and was one of the "two Livesley boys." It is known that in 1889 Tom was a butcher at the same Seattle address as his brother George who was a grocer. In 1890 he was part of "Livesley Brothers" hop dealers with siblings Robert and George (Bush 2000).

In February 1890, Tom married Myrta Emeline Hubbell in Seattle. She was the daughter of prominent LaValle farmer and Judge Wellington Hubbell who had also moved to Seattle. They did not have any children and were divorced in 1903 (Bush 2000).

In the early 1900s, Thomas spent time in California, where he was in the grapefruit business, as well as having a melon ranch. He met his second wife Edna DeBeck in San Francisco who was Canadian and had attended Mills College in Oakland where she studied nursing. They were married in Vancouver, BC in September 1908. The Livesleys bought several hundred acres and began to grow cantaloupes, that were

sold though Hiram Wood and his company The Woods Company. It is recorded that Thomas purchased land in what would become the City of Brawley from 1908 to 1911, including the property on which the 5003 Best Road farm/ranch complex was constructed. In 1908, Thomas founded his hop business "T.A. Livesley and Co." with his partner and friend Jack Roberts. Mr. Roberts was involved until 1924 when they amicably dissolved their partnership and Thomas became sole owner. It is unknown if Thomas ever resided in Brawley or just held land patents for agricultural use. At an unknown date, likely after initial construction, the drain immediately south of the 5003 Best Road property was named the Livesley Drain (Bush 2000).

At an unknown date between 1911 and 1927, Thomas and his wife moved to Salem, Oregon. Between 1910 and 1921 the couple had four children. Thomas was a busy man who had many resources and businesses and by 1924 became known as the "Hop King" because he was the largest grower of hops in Oregon. He also served as Vice President of Oregon Linen Mills. In 1927, Tom commissioned the Livesley Tower, an 11-story office building in downtown Salem. Space in this building was managed and leased by the Livesleys until its sale in 1960. The Livesleys had a mansion built which was designed by Ellis F. Lawrence, the founder of the University of Oregon School of Architecture; this house would later be sold n 1988 to the state to become the Governor's Mansion (Bush 2000).

Thomas was elected as Mayor of Salem, Oregon and served from 1927 to 1931. His mayorship was marked by much improvement, noticeably moving Salem toward a council-manager form of government, replacing many of the town's wooden bridges with concrete ones, construction of the Salem Airport, and the installation of streetlights. He was adamant that these changes be made with concern for the beauty of the city. He was known as the "Good Roads" mayor. He later served as Marion County State Representative from 1937 to 1939 (Bush 2000).

Thomas lived a full and successful life and passed away in Salem of skin cancer in July of 1947, at the age of 84 (Bush 2000).

Change of Title

At an unknown date, the 5003 Best Road property was sold by the Livesley family. In 1976, based on Permit 14097, ownership of the property was held by Joe Flammang (County of Imperial 2021). In 1980, a grant of all minerals, gases, and water in a portion of the west half of the south half of Tract 120 was divided between Dennis Flammang, Joseph Flammang, Paula Ann McCormick, and Mary Dee Flammang (Stewart Title of California 2006).

Joseph Flamming, one of the Flamming children, was born in Brawley in 1946 to parents John and Lois. In 1962, Mr. and Mrs. Flammang started a farm family business. Joseph grew up and attended school in Brawley and later attended Cal Poly in Pomona, California. After college, he traveled to Iran on a farming project for the Iran California Company. He farmed in Brawley, starting John Flammang Farms in 1998, and in later years was a substitute high school teacher. There is minimal information available on Joseph's siblings aside from their property ownership. Joseph passed away on February 22, 2018 (Legacy 2021).

In 1988, based on Permit 28722, the property owners were Loma Farms, Inc., a California corporation owned by John Flamming. In 2008, a geothermal lease was executed by the Flammangs and McCormick with ORNI 17, LLC as the lessor. Based on the County of Imperial's Assessor the land was most recently sold to ORNI 19, LLC in 2009 who plan to construct a solar energy field (Stewart Title of California 2006).

Residence Construction

The main residential building appears to correspond to typical Minimal Traditional style of form and construction, which dates range from 1935 to 1955, and is resting on a perimeter foundation of poorly consolidated concrete made with local materials (City of San Diego 2007). Wood joists are noted in the interior where exposed, suggesting a post-and-pier foundation for the floor of the building. The outline is a simple rectangle with a low, gabled roofline and minimal pitch. Roof eaves minimally extend, with boxed in soffits. The exterior is treated in stucco, using techniques typical of the period; tarpaper wrap, with wire mesh, a brown/scratch coat, and a finish coat. There are several wood-trimmed piercings for wood-cased double-sash windows. Cast-iron waste pipes are embedded into the exterior surface along one wall.

Several outbuildings are present, but their function remains unknown at this time. These are wood-framed and sided, and most are in a state of collapse or disrepair. Construction techniques and the greater fullness of the dimensions of the dimensional lumber suggest that these buildings are contemporaneous with the main residential building. The house and associated structures are still present. There are many mature trees lining the eastern and northern perimeters.

Evaluation Recommendation

Based on the evaluation of the residence, either as a complex or as individual structures, none of the four criteria are met for inclusion in the CRHR and the resource is recommended not eligible (OHP 2021).

Criterion 1: This resource does not meet the criteria under Criterion 1 as it is not associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States. Therefore, this resource is recommended not eligible for the CRHR under Criterion 1.

Criterion 2: This resource does not meet Criterion 2 as it is not associated with the lives of persons who are important to local, California history. While research has yielded information to suggest that one of the original land patent holders, Thomas A. Livesley, was fairly prominent in Salem, Oregon, neither he nor his family, or those also listed on the 1911 land patent, were specifically associated with Brawley or Imperial Valley, California history. There is no evidence that Mr. Livesley or his family ever resided at 5003 Best Road and were not mentioned as being influential in literature regarding the Imperial Irrigation District between the 1900s and 1940s or the history of Imperial Valley between the 1900s and 1930s (Dowd 1956; Tout 1931). It is likely that Mr. Livesley and the other parties listed on the land patent were involved in speculative agriculture but were not personally invested in the overall development of Brawley or within Imperial Valley.

Additionally, there is no evidence that the subsequent property titles holders, namely the Flammangs, were of particular significance in Brawley. The Flammangs were owners of a few farms over the decades, but there is no documentation stating any noteworthy influence in Brawley, Imperial Valley, or California. Therefore, this resource is recommended not eligible for the CRHR Criterion 2.

Criterion 3: This resource does not meet Criterion 3 for embodying the distinctive characteristics of a type, period, or method of construction; or as a representative work of a master; or for possessing high artistic values. represent a very common property type throughout the United States, California, and San Diego. Many Traditional Style residences were constructed throughout the United States during the twentieth century and these examples are neither unique nor innovative for the period in which they were constructed. Therefore, this resource is recommended not eligible for the CRHR under Criterion 3.

Criterion 4: This resource does not meet Criterion 4 since it is unlikely to yield information important to prehistory or history. It is unlikely that this property has the potential to broaden our understanding of the history of the United States, California, or San Diego during the twentieth century. Therefore, this resource is recommended not eligible for the CRHR under Criterion 4.

Photos



Figure 1: Main residence, facing northwest



Figure 2: Fenced lot east of main residence, facing northeast towards Best Road



Figure 3: Main residence and outbuilding, facing southeast

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BIOLOGICAL TECHNICAL REPORT FOR THE BRAWLEY SOLAR PROJECT IMPERIAL COUNTY, CALIFORNIA

Prepared for:

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August 2021

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SECTION 1.0 – INTRODUCTION

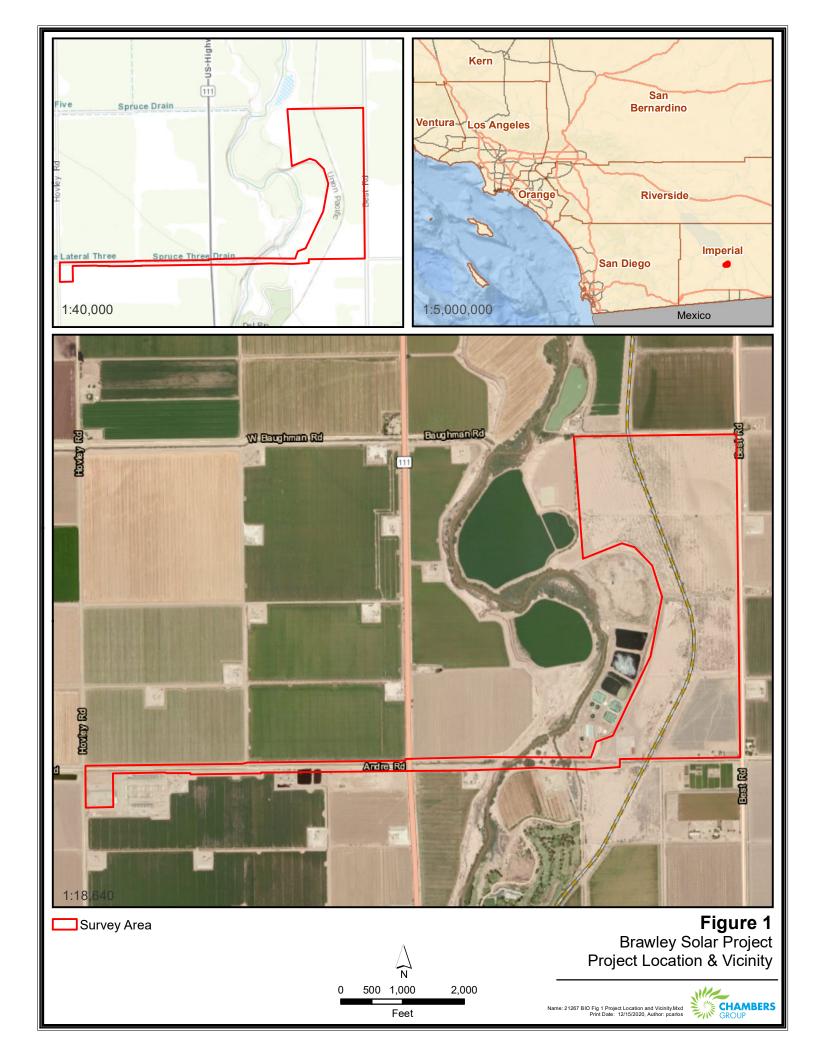
Chambers Group, Inc. (Chambers Group) was retained by ORNI 30, LLC (ORNI) to conduct a literature review and reconnaissance-level survey for the development of the Brawley Solar Project (Project). The survey identified vegetation communities, potential waters of the state and waters of the U.S., wetlands, and potential for the occurrence of sensitive species or habitats that could support sensitive wildlife species. Information contained in this Biological Technical Report is in accordance with accepted scientific and technical standards that are consistent with the requirements of United States Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW).

1.1 PROJECT BACKGROUND

ORNI is proposing to build, operate, and maintain the Brawley Solar Energy Facility, a 40 megawatt (MW)/160 megawatt-hour (MWh) photovoltaic (PV) solar farm and 40 MW/160 MWh battery energy storage system (BESS) on approximately 227 acres in Brawley, Imperial County. Power generated by the Project would be low-voltage direct current (DC) power that would be collected and routed to a series of inverters and their associated pad-mounted transformers. The inverters would convert the DC power generated by the panels to alternating current (AC) power, and the pad-mounted transformers would step up the voltage. The Project would connect to the North Brawley Geothermal Power Plant southwest of the Project site via an approximately 1.8-mile-long aboveground 92 kilovolt (kV) generation tie line (gen-tie line).

1.2 PROJECT LOCATION

The Project is located at 5003 Best Avenue, Brawley, California, on six privately owned parcels (Project site). The Project is located within the U.S. Geological Survey (USGS) *Westmorland East*, California, 7.5-minute topographic quadrangle. Currently the Project site contains fallow alfalfa fields. The Project site is bordered by undeveloped agricultural land to the north and east and a mixture of undeveloped agricultural land and dirt lots used for staging activities to the south, and the City of Brawley Wastewater Treatment Plant is located along the western edge of the Project site. The elevation at the Project site is approximately 145 feet below mean sea level (bmsl). Maps of the Project location and Project vicinity are provided in Figure 1.



SECTION 2.0 – METHODOLOGY

2.1 LITERATURE REVIEW

Prior to performing the field survey, existing documentation relevant to the Project site was reviewed. The most recent records of the California Natural Diversity Database (CNDDB) managed by CDFW (CDFW 2020), the USFWS Critical Habitat Mapper (USFWS 2020), and the California Native Plant Society's Electronic Inventory (CNPSEI) of Rare and Endangered Vascular Plants of California (CNPS 2020) were reviewed for the following quadrangles containing and surrounding the Project site: Westmorland East, Niland, Obsidian Butte, Westmorland West, West, Iris, Alamorio, Brawley, and Brawley Northwest, California, USGS 7.5-minute quadrangles. These databases contain records of reported occurrences of federally or state listed endangered or threatened species, California Species of Concern (SSC), or otherwise sensitive species or habitats that may occur within or in the immediate vicinity of the Project site.

2.2 SOILS

Before conducting the survey, soil maps for Imperial County were referenced online to determine the soil types found within the Project site. Soils were determined in accordance with categories set forth by the U.S. Department of Agriculture (USDA) Soil Conservation Service and by referencing the USDA Natural Resources Conservation Service (NRCS) Web Soil Survey (USDA 2020).

2.3 JURISDICTIONAL WATERS

A general assessment of jurisdictional waters regulated by the United States Army Corps of Engineers (USACE), California Regional Water Quality Control Board (RWQCB), and CDFW was conducted for the Project site. Pursuant to Section 404 of the Clean Water Act, USACE regulates the discharge of dredged and/or fill material into waters of the United States. The State of California (State) regulates discharge of material into waters of the State pursuant to Section 401 of the Clean Water Act and the California Porter-Cologne Water Quality Control Act (California Water Code, Division 7, §13000 et seq.). Pursuant to Division 2, Chapter 6, Sections 1600-1602 of the California Fish and Game Code, CDFW regulates all diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake which supports fish or wildlife. The assessment was conducted by a desktop survey through the USGS National Hydrography Dataset for hydrological connectivity.

2.4 BIOLOGICAL RECONNAISSANCE-LEVEL SURVEY

Chambers Group biologists Brian Cropper and Genelle Ives conducted the general reconnaissance survey (survey) within the Project site to identify the potential for occurrence of sensitive species, vegetation communities, or habitats that could support sensitive wildlife species. The survey was conducted on foot throughout the Project site between 0830 and 1715 hours on October 22, 2020. Weather conditions during the survey included temperatures ranging from 65 to 73 degrees Fahrenheit, with 80 percent cloud cover and no precipitation. Photographs of the Project site were recorded to document existing conditions (Appendix A).

2.4.1 <u>Vegetation</u>

All plant species observed within the Project site were recorded. Vegetation communities within the Project site were identified, qualitatively described, and mapped onto a high-resolution imagery aerial photograph. Plant communities were determined in accordance with the *Manual of California Vegetation*, *Second Edition* (Sawyer et al. 2009). Plant nomenclature follows that of *The Jepson Manual* (Baldwin et al. 2012). A comprehensive list of the plant species observed during the survey is provided in Appendix B.

2.4.2 Wildlife

All wildlife and wildlife signs observed and detected, including tracks, scat, carcasses, burrows, excavations, and vocalizations, were recorded. Additional survey time was spent in those habitats most likely to be utilized by wildlife (native vegetation, wildlife trails, etc.) or in habitats with the potential to support state and/or federally listed or otherwise sensitive species. Notes were made on the general habitat types, species observed, and the conditions of the Project site. A comprehensive list of the wildlife species observed during the survey is provided in Appendix C.

SECTION 3.0 – RESULTS

3.1 NATURAL COMMUNITY CONSERVATION PLAN & HABITAT CONSERVATION PLAN

The Project site is located within the designated boundaries of the Desert Renewable Energy Natural Community Conservation Plan & Habitat Conservation Plan (NCCP/HCP). However, the Project is not located within or adjacent to an Area of Critical Environmental Concern.

3.2 SOILS

According to the results from the USDA NRCS Web Soil Survey (USDA 2020), the Project site is located in the Imperial Valley Area, CA683 part of the soil map. Six soil types are known to occur within and/or adjacent to the site and are described below.

Badland occurs along the western portion of the Project site. The parent material is composed of alluvium. This soil is not rated as hydric, and the runoff class is high.

Imperial Silty Clay complex occurs throughout the Project site. The parent material is clayey alluvium derived from mixed or clayey lacustrine deposits. The available water capacity is classified as moderate (approximately 8.3 inches) with a depth to the water table of more than 80 inches.

Imperial Glenbar Silty Clay Loam occurs along the western portion and eastern edge of the Project site. The parent material is clayey alluvium derived from mixed and/or clayey lacustrine deposits. The available water capacity is moderate (approximately 8.6 inches) with a depth to the water table of more than 80 inches.

Indio-Vent complex occurs in the southern portion of the Project site just east of the New River. The parent material is alluvium derived from mixed and/or eolian deposits. The available water capacity is moderate (approximately 8.5 inches) with a depth to the water table of more than 80 inches.

Meloland Very Fine Sandy Loam occurs along the drainages in the southern portion of the Project site. The parent material is alluvium derived from mixed and/or eolian deposits. The available water capacity is moderate (approximately 7.8 inches) and a low runoff class. The depth to the water table is more than 80 inches.

Vint and Indio Very Fine Sandy Loam occurs along the drainage in the southwest portion of the Project site. The parent material is alluvium derived from mixed sources and/or eolian deposits. The available water capacity is moderate at about 6.8 inches. The depth to the water table is more than 80 inches.

3.3 JURISDICTIONAL WATERS

The western portion of the Project site is located within the New River watershed (Hydrologic Unit Code [HUC-10] 1810020411) and within the Federal Emergency Management Agency (FEMA) 100-year flood zone (Figure 2). The New River watershed at the Project site is bordered to the south by Imperial Valley, to the west by the Vallecito Mountains, to the north by the Salton Sea, and to the east by the Chocolate Mountains. The New River is the major water source for the watershed, which drains into the Salton Sea. Along its watercourse, several tributaries, including mostly agricultural drains and canals discharge into the New River. The eastern portion of the Project site is located within the Alamo River watershed (HUC-

10 1810020408) and is within the FEMA 100-year flood zone (Figure 2). The Alamo River is the major water source for the watershed, which also drains into the Salton Sea. The primary tributaries to the Alamo River are agricultural drains and canals. Both rivers are known to be heavily polluted with agricultural and bacterial toxins.

Several jurisdictional and non-jurisdictional features were observed within the Project site. The New River, a National Wetlands Inventory (NWI) mapped blueline, flows through the middle portion of the Project site (Figure 2). In addition, several NWI mapped blueline canals, drains, and ditches owned by Imperial Irrigation District (IID) flow along the borders of the Project site (Figure 2). Locations of the features observed during the field survey are presented in Figure 3.

Feature 1, the IID "Spruce Three Drain," occurs along the proposed gen-tie line located in the southwest portion of the Project site along Andre Road. The Spruce Three drain is a mapped NWI stream (Riverine Intermittent Stream Bed, Seasonally Flooded, Excavated). The drainage is man-made and receives flow from surface runoff from Andre Road and surrounding agricultural fields. Bank-to-bank measurements ranged from 13 to 80 feet. Ordinary High Water Mark (OHWM) measurements ranged from 6 to 40 feet. The drain flows into the Project site from the west at Hovley Road along the south side of Andre Road, flows east for approximately 0.50 mile and crosses under Andre Road to the north side of the road, and appears to continue to flow eastward until it empties into the New River, which terminates at the Salton Sea. The feature is lined with riparian vegetation dominated by arrow weed (*Pluchea sericea*) a Facultative Wetland (FACW) species, meaning one that usually occurs in wetlands but is also found in non-wetlands (Lichvar et al. 2016).

Feature 2 occurs along the gen-tie line portion of the Project site, on the north side of Andre Road. Feature 2 is a man-made, unvegetated cement-lined ditch. Bank-to-bank measured 10 feet; the OHWM measured 4 feet. The feature flows into the Project site from the west for approximately 0.50 mile, where it appears to connect to the Spruce Three Drain. Feature 2 receives flow from road runoff and agricultural runoff from the surrounding agricultural fields.

Feature 3, the New River, flows through the eastern portion of the gen-tie line. The New River is an NWI mapped blueline wetland riverine system (Riverine Lower Perennial, Unconsolidated Bottom Wetland, Permanently Flooded). Bank-to bank-measurements ranged from 110 to 170 feet. OHWM measurements ranged from 42 to 107 feet. The river flows south to north from Mexico and terminates in the Salton Sea. Within the Project site, the vegetation along the banks of the river consists completely of tamarisk (*Tamarix* spp.) a Facultative (FAC) species, one that is equally likely to occur in wetlands or non-wetlands (Lichvar et al. 2016).

Feature 4, the IID "Livesly Drain," occurs east of the New River in the eastern portion of the gen-tie line. The Livesly Drain is a NWI mapped blueline stream. This feature is man-made and receives flow from agricultural runoff. The Livesly Drain flows into the Project site from the east, turns north, and exits into the New River. Bank-to-bank measurements ranged from 20 to 120 feet. The OHWM measurements ranged from 13 to 20 feet. The portion of the drainage within the Project site is composed completely of tamarisk.

Feature 5, the IID "Oakley Canal," occurs just south of the Livesly Drain. The Oakley Canal is a NWI mapped blueline stream (Riverine Intermittent Stream Bed, Seasonally Flooded, Excavated). Feature 5 is manmade and receives flow from agricultural runoff. The Oakley Canal flows south to north and empties into

the Livesly Canal. Bank-to-bank measurements ranged from 25 feet to 48 feet. OHWM measured 15 feet. The vegetation along the banks of Feature 5 consists primarily of tamarisk.

Feature 6, the IID "Best Canal," occurs along the eastern border of the Project site on the west side of Best Avenue. The canal is a NWI mapped blueline stream (Riverine Intermittent Stream Bed, Seasonally Flooded, Excavated) that receives flow from agricultural and road run-off. Bank-to-bank the canal measured 15 feet; OHWM measured 5 feet. The canal is unvegetated throughout the Project site and flows south to north, exits the Project site, turns west and eventually empties into the New River.

Feature 7 occurs in the southeast portion of the Project site on the south side of Andre Road along the gen-tie line. Feature 7 consists of two man-made detention ponds with riparian vegetation and are mapped NWI wetlands (Palustrine Unconsolidated Bottom Wetland, Permanently Flooded, Excavated). The vegetation within Feature 7 is dominated by tamarisk and cattail (*Typha* spp.), an Obligate (OBL) species, one that almost always occurs naturally in wetlands (Lichvar et al. 2016). In addition, arrow weed and big saltbush (*Atriplex lentiformis*), also known as quail bush, a FAC species, were observed.

Several man-made unvegetated ditches were observed throughout the Project site. When a field is irrigated, water is allowed to flow through smaller man-made earthen or concrete-lined ditches (typically referred to as a "head ditch"), which distributes the water evenly across the field. At the opposite, lower elevation side of the field, excess water is collected into another ditch (typically referred to as a "tail ditch"). The ditches present on the Project site are both earthen and concrete-lined and are frequently rebuilt when the fields are plowed and disked. These ditches occur primarily along the edges of the agricultural fields and across portions of the fields. None of these ditches connect directly to a major feature, and most terminate at small, man-made detention areas. Therefore, these features are not considered jurisdictional under CDFW, RWQCB, or USACE.

The Imperial County Fire Department (ICFD) Fire Prevention Bureau requires two points of emergency access for the Project along the west side of the railroad tracks. The access routes will be approximately 20 feet wide to allow large vehicles, including fire trucks and heavy equipment, access to the site. One access routes may be extended from the main access road located off Best Avenue utilizing an existing access road that crosses over a concrete lined channel and a second access route is proposed to be constructed in the northwest portion of the Project site crossing over a non-jurisdictional irrigation ditch. Vegetation within this feature comprised of quail bush, and non-native Mexican palo verde (*Parkinsonia aculeata*) and tamarisk.

3.4 **VEGETATION COMMUNITIES**

Nine vegetation communities, Quail Bush Scrub, Agricultural, Bare Ground, Developed, Disturbed, Bush Seepweed Scrub, Arrow Weed Thickets, Ornamental and Tamarisk Thickets were observed within the Project site. A map showing the vegetation communities observed within the Project site is provided in Figure 4, and the communities are described in the following subsections.

3.4.1 Quail Bush Scrub

Quail bush scrub is dominated by quail bush with scattered bush seepweed (*Sueda nigra*) present in areas where the habitat gently slopes into more alkaline soils. The shrub layer is thick and continuous with a nonexistent herbaceous layer. Stands occur in areas where less alkaline or saline soils are present, favoring clay soils and more consistent topography where water does not accumulate easily (Sawyer et al. 2009).

Plant species observed within the Project site included bush seepweed, big saltbush, and spiny chlorocantha (*Chloracantha spinosa*). Approximately 4.86 acres of Quail Bush Scrub occurs within the Project site survey area.

3.4.2 <u>Agricultural</u>

Large swaths of the Project site consist of plots of agricultural fields that are no longer in use. Bermuda grass (*Cynodon dactylon*) is found in these areas with alfalfa (*Medicago sativa*) seedlings in lower numbers. Agricultural fields are similar to Bare Ground habitat where areas have higher water permeability and higher fossorial rodent habitat potential. Mexican palo verde are planted along the outside of several agriculture fields as wind breaks for agricultural purposes, these areas are therefore considered agricultural habitat. Trees are mature, averaging 15 meters in height and are continuously planted alongside the agricultural fields. Isolated honey mesquite (*Prosopis glandulosa*) shrubs were observed along the northwestern portion of the Project site along the tree line. Other plant species observed within the Project site included alfalfa (*Medicago sativa*), Mexican palo verde, big saltbush, and tamarisk. Approximately 91.96 acres of Agricultural fields occur within the Project site survey area.

3.4.3 Bare Ground

Bare Ground areas are generally devoid of vegetation but do not contain any form of pavement. Bare Ground has higher water permeability and higher fossorial rodent habitat potential. Bare Ground is present throughout the entire Project site, with small patches between agricultural land and long swaths that include dirt access roads that receive very little use. Isolated alfalfa was the only vegetation observed in these areas. Approximately 148.07 acres of Bare Ground occurs within the Project site survey area.

3.4.4 <u>Developed</u>

Developed areas are areas that have been altered by humans and now display man-made structures such as urban areas, houses, paved roads, buildings, parks, and other maintained areas (Gray and Bramlet 1992). Approximately 4.40 acres of Developed area occurs within the Project site survey area.

3.4.5 Disturbed

Disturbed areas generally have altered topography and soils due to man-made reasons, usually pertaining to development or agricultural purposes. Any shrubs in the shrub canopy are isolated, and the herbaceous layer is sparse to intermittent with pockets of advantageous non-native species that spread from a singular location. Species observed included Bermuda grass (*Cynodon dactylon*), Mediterranean schismus (*Schismus barbatus*), and lamb's quarters (*Chenopodium album*). Approximately 6.38 acres of Disturbed areas occur within the Project site survey area.

3.4.6 <u>Bush Seepweed Scrub</u>

Bush seepweed is dominant in the shrub canopy with scattered quail bush present. The shrub layer is intermittent to continuous with an herbaceous layer that is very sparse. Stands occur in gently sloping plains bordering agricultural fields or irrigation ditches and areas with disturbed hydrology due to manmade alteration. Soils are deep and saline or alkaline (Sawyer et al. 2009). Species observed within the Project site included bush seepweed and big saltbush. Approximately 3.52 acres of Bush Seepweed Scrub occurs within the Project site survey area.

3.4.7 Arrow Weed Thickets

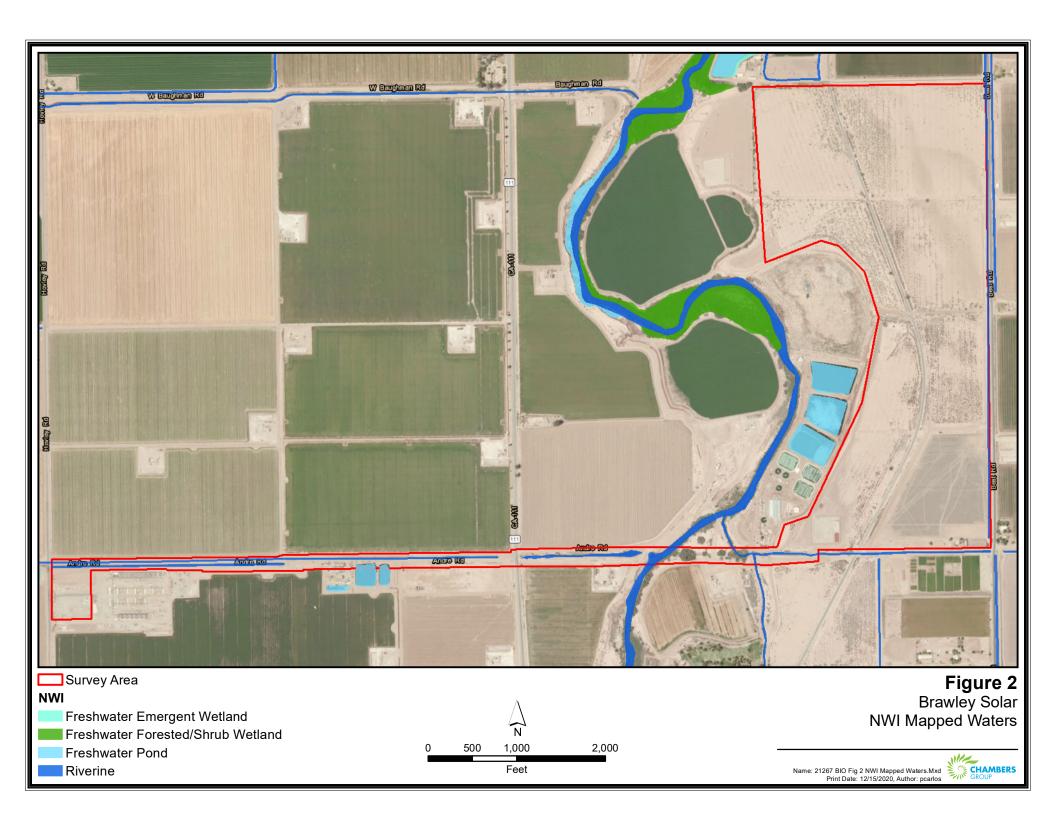
The shrub canopy is intermittent to continuous with shrubs reaching 2 to 3 meters in height. Vegetation is dominated by arrow weed and extends along the water feature, occasionally extending over the bank and into the access road. The herbaceous layer is open and intermittent, existing in between stands of cattail and arrow weed. The habitat exists in irrigation ditches consisting of soils that are sandy and loamy where water is permeable. Plant species observed included arrow weed, tamarisk, cattail, big saltbush, saltgrass (*Distichlis spicata*), and salt heliotrope (*Heliotropium curassavicum*). Approximately 6.23 acres of Arrow Weed Thickets occur within the Project site survey area.

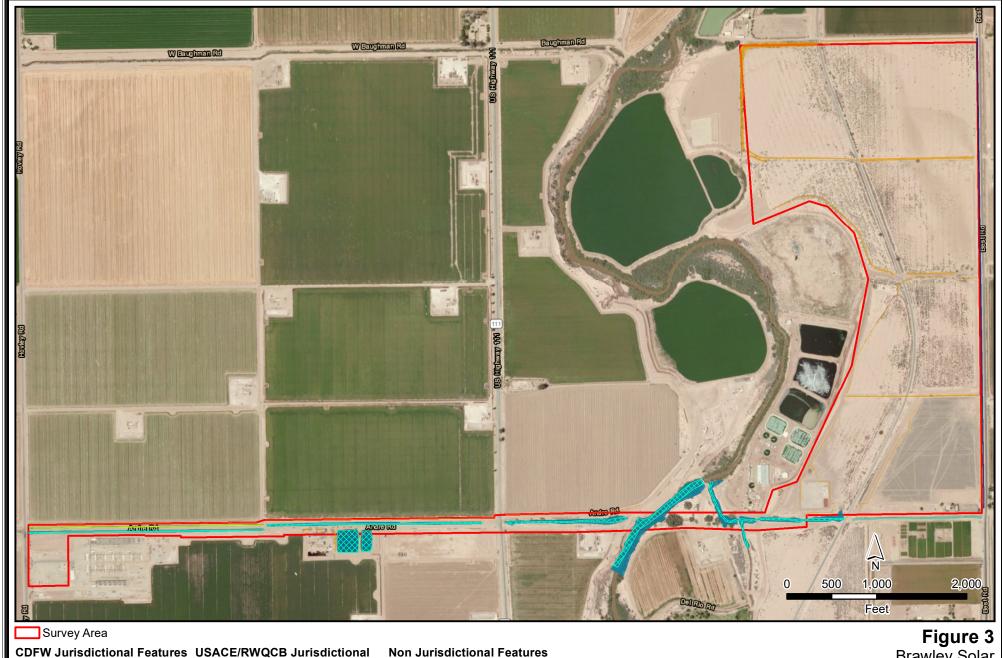
3.4.8 Ornamental

Ornamental Landscaping includes areas where the vegetation is dominated by non-native horticultural plants (Gray and Bramlet 1992). Typically, the species composition consists of introduced trees, shrubs, flowers, and turf grass. Approximately 1.87 acres of Ornamental Landscaping occurs within the Project site survey area.

3.4.9 <u>Tamarisk Thickets</u>

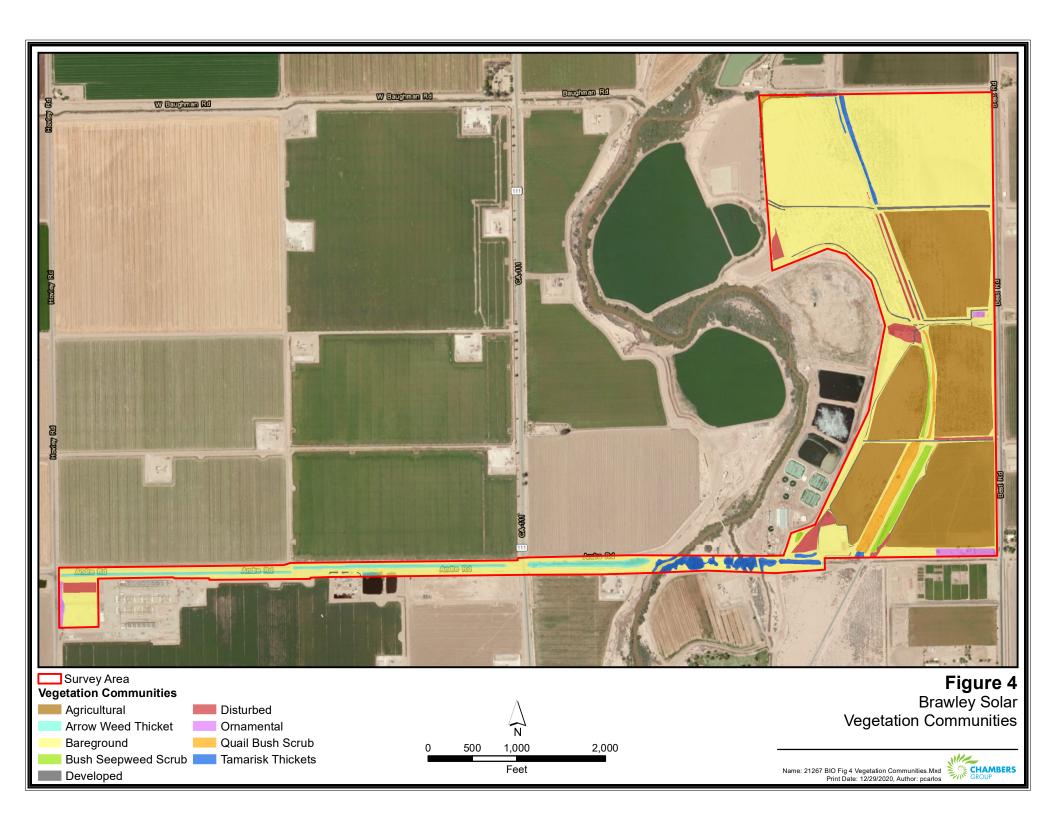
Tamarisk dominates the tree canopy and is thick and continuous. This non-native shrub layer is sparse with isolated quail bush present, while the herbaceous layer contains very little vegetation. Trees average 15 meters in height and exist in irrigation ditches or on the upper banks along water features. Species observed within the Project site included tamarisk and big saltbush. Approximately 5.16 acres of Tamarisk Thickets occur within the Project site survey area.





Features Wetland Non-Jurisdictional Ditch Wetland Non-Vegetated Drainage Upland Vegetated Channel Non-Vegetated Drainage

Figure 3Brawley Solar Jurisdictional Waters



3.5 SENSITIVE SPECIES

The following information is a list of abbreviations used to help determine the significance of biological sensitive resources potentially occurring on the Project site.

Rare Plant Rank (RPR)

List 1A	=	Plants presumed extinct in California
List 1B	=	Plants rare and endangered in California and throughout their range
List 2	=	Plants rare, threatened, or endangered in California but more common elsewhere in their range
List 3	=	Plants about which we need more information; a review list
List 4	=	Plants of limited distribution; a watch list

RPR Extensions

0.1	=	Seriously endangered in California (greater than 80 percent of occurrences
		threatened/high degree and immediacy of threat)
0.2	=	Fairly endangered in California (20-80 percent occurrences threatened)
0.3	=	Not very endangered in California (less than 20 percent of occurrences
		threatened)

Federal

FE	=	Federally listed; Endangered
FT	=	Federally listed; Threatened

State

ST	=	State listed; Threatened
SE	=	State listed; Endangered
RARE	=	State-listed; Rare (Listed "Rare" animals have been redesignated as Threatened,
		but Rare plants have retained the Rare designation.)
SSC	=	State Species of Special Concern

The following information was used to determine the significance of biological resources potentially occurring within the Project site. The criteria used to evaluate the potential for sensitive species to occur on the Project site are outlined in Table 1.

Table 1: Criteria for Evaluating Sensitive Species Potential for Occurrence (PFO)

PFO	CRITERIA	
Absent:	Species is restricted to habitats or environmental conditions that do not occur within the Project site. Additionally, if the survey was conducted within the blooming period of the species and appropriate habitat was observed in the surrounding area but the species was not observed within the Project impact area, it was considered absent.	
Low: Historical records for this species do not exist within the immediate vicinity (approxi 5 miles) of the Project site, and/or habitats or environmental conditions needed to s the species are of poor quality.		
Moderate:	Either a historical record exists of the species within the immediate vicinity of the Project site (approximately 3 miles) and marginal habitat exists on the Project site, or the habitat requirements or environmental conditions associated with the species occur within the Project site, but no historical records exist within 5 miles of the Project site.	
High:	Both a historical record exists of the species within the Project site or its immediate vicinity (approximately 1 mile), and the habitat requirements and environmental conditions associated with the species occur within the Project site.	
Present:	Species was detected within the Project site at the time of the survey.	

^{*} PFO: Potential for Occurrence

3.5.1 Sensitive Plants

Factors used to determine the potential for occurrence included the quality of habitat, elevation, and the results of the reconnaissance survey. In addition, the location of prior CNDDB records of occurrence were used as additional data; but since the CNDDB is a positive-sighting database, this data was used only in support of the analysis from the previously identified factors.

Current database searches (CDFW 2020; CNPSEI 2020) resulted in a list of five federally and/or state listed threatened and endangered or rare sensitive plant species that may potentially occur within the Project site (Figure 5). After the literature review and the reconnaissance-level survey, it was determined that one species had a Moderate potential to occur; and four of these species are considered Absent from the Project site due to lack of suitable habitat.

The following four plant species are considered **Absent** from the Project site due to lack of suitable habitat:

- gravel milk-vetch (Astragalus sabulonum) -2B.2
- Munz's cholla (Cylindropuntia munzii) 1B.3
- glandular ditaxis (Ditaxis claryana) 2B.2
- Thurber's pilostyles (Pilostyles thurberi) 4.3

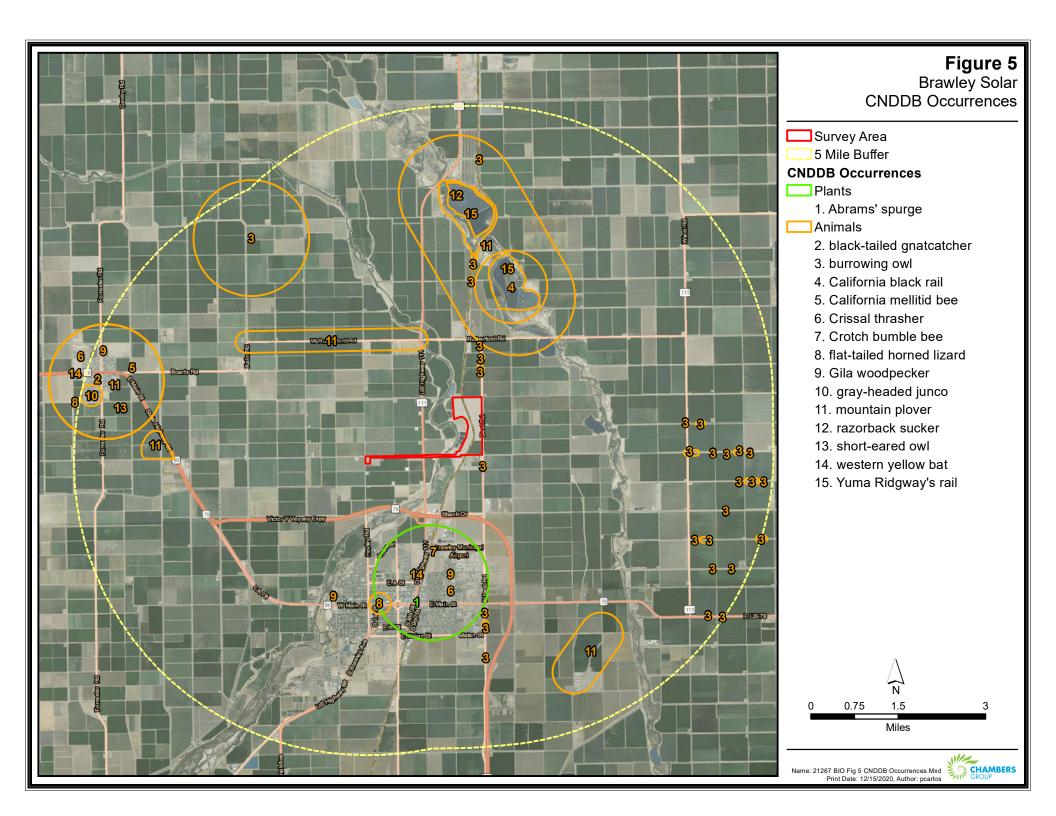
The following species is considered **Low Potential** to be observed in the Project site due to lack of suitable habitat:

Abram's spurge (Euphorbia abramsiana) – 2B.2

Abram's spurge is an annual herb in the spurge family that mostly exists in Sonoran or Mojave Desert habitats, favoring sandy flats where water is permeable (Sawyer et al. 2009). Although the habitats

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available at the Project site are not typically where this plant would grow, it has the low potential to occur in fields, irrigation ditches, and other disturbed areas that all exist within the Project site. In addition, this species was positively identified less than 2 miles from the Project site. This identification, however, was made before 1940 and the population is presumed to be extirpated due to agricultural and residential development.



3.5.2 Sensitive Wildlife

A current database search (CDFW 2020) resulted in a list of 23 federally and/or state listed endangered or threatened, Species of Concern, or otherwise sensitive wildlife species that may potentially occur within the Project site (Figure 5). After a literature review and the assessment of the various habitat types within the Project site, it was determined that 17 sensitive wildlife species were considered absent from the Project site, three species have a low potential to occur, two species have a high potential to occur, and one species was present within the Project site. Factors used to determine potential for occurrence included the quality of habitat and the location of prior CNDDB records of occurrence.

The following 17 wildlife species are considered **absent** from the Project site due to lack of suitable habitat present on the Project site:

- American badger (Taxidea taxus)- SSC
- black skimmer (Rynchops niger) SSC
- California black rail (Laterallus jamaicensis coturniculus) ST
- Colorado Desert fringe-toed lizard (Uma notata) SSC
- crissal thrasher (Toxostoma crissale) SSC
- desert pupfish (Cyprinodon macularius) FE, SE
- Gila woodpecker (Melanerpes uropygialis) SE
- gull-billed tern (Gelochelidon nilotica) SSC
- Le Conte's thrasher (Toxostoma lecontei) SSC
- lowland leopard frog (Lithobates yavapaiensis) SSC
- Palm Springs pocket mouse (Perognathus longimembris bangsi) SSC
- razorback sucker (Xyrauchen texanus) FE, SE
- Sonoran Desert toad (Incilius alvarius) SSC
- western snowy plover (Charadrius alexandrinus nivosus) FE, SSC
- yellow warbler (Setophaga petechia) SSC
- Yuma hispid cotton rat (Sigmodon hispidus eremicus) SSC
- Yuma Ridgway's rail (Rallus obsoletus yumanensis) FE, ST

The analysis of the CNDDB search and field survey resulted in three species with a **low** potential to occur on the Project site due to low quality habitat and are described below:

- flat-tailed horned lizard (Phrynosoma mcallii) SSC
- short-eared owl (Asio flammeus) SSC
- western yellow bat (Lasiurus xanthinus) SSC

The analysis of the CNDDB search and field survey resulted in two species with a **high** potential to occur on the Project site. Burrowing owl (*Athene cunicularia*) and Mountain plover (*Charadrius montanus*) have a high potential to occur and are described below:

Burrowing owl-SSC

The burrowing owl (BUOW) is a California Species of Special Concern. The burrowing owl breeds in open plains from western Canada and the western United States, Mexico through Central America, and into South America to Argentina (Klute et al. 2003). This species inhabits dry, open, native or non-native grasslands, deserts, and other arid environments with low-growing and low-

density vegetation (Ehrlich et al. 1988). It may occupy golf courses, cemeteries, road rights-of way, airstrips, abandoned buildings, irrigation ditches, and vacant lots with holes or cracks suitable for use as burrows (TLMA 2006). Burrowing owls typically use burrows made by mammals such as California ground squirrels (*Otospermophilus beecheyi*), foxes, or badgers (Trulio 1997). When burrows are scarce, the burrowing owl may use man-made structures such as openings beneath cement or asphalt pavement, pipes, culverts, and nest boxes (TLMA 2006). High quality habitat exists within the Project site. In addition, burrowing owl have recently been recorded within 0.14 mile of the Project site. Therefore, this species has a high potential to occur within the Project site.

Mountain plover – SSC

The mountain plover (wintering) is a California Species of Special Concern and a federally Proposed Threatened Species. This species breeds from the prairie and sagebrush country of north-central Montana, eastern Wyoming, and the area around southeastern Colorado. It winters from central California along the southern border southward to northern Mexico (Udvardy 1977). Common wintering habitats consist of dry, barren ground, smooth dirt fields, agricultural fields, and shortgrass prairies. This species tends to form small flocks in the winter. It is one of the few shorebird species that prefers habitats away from water. The Project site contains suitable habitat of moderate to high quality. In addition, mountain plover have been recorded to occur within 1 mile of the Project site. Therefore, this species has a high potential to occur with the site.

One species, the loggerhead shrike (*Lanius Iudovicianus*), was **present** within and directly adjacent to the Project site during the survey. In addition, this species has been recorded to nest within and surrounding the Project site.

Loggerhead shrike – SSC

The loggerhead shrike (nesting) is a California Species of Special Concern. Habitats may include oak savannas, open chaparral, desert washes, juniper woodlands, Joshua tree woodlands, and other semi-open areas. It can occupy a variety of semi-open habitats with scattered trees, large shrubs, utility poles, and other structures that serve as lookout posts while searching for potential prey. Loggerhead shrikes prefer dense, thorny shrubs and trees, brush piles, and tumbleweeds for nesting (Seattle Audubon Society 2008). During the survey, one individual was observed just outside the northwest boundary of the Project site, and an additional individual was observed within the southwest portion of the Project site (Figure 6). In addition, suitable nesting and foraging habitat is present within and directly adjacent to the Project site.

3.6 GENERAL PLANTS

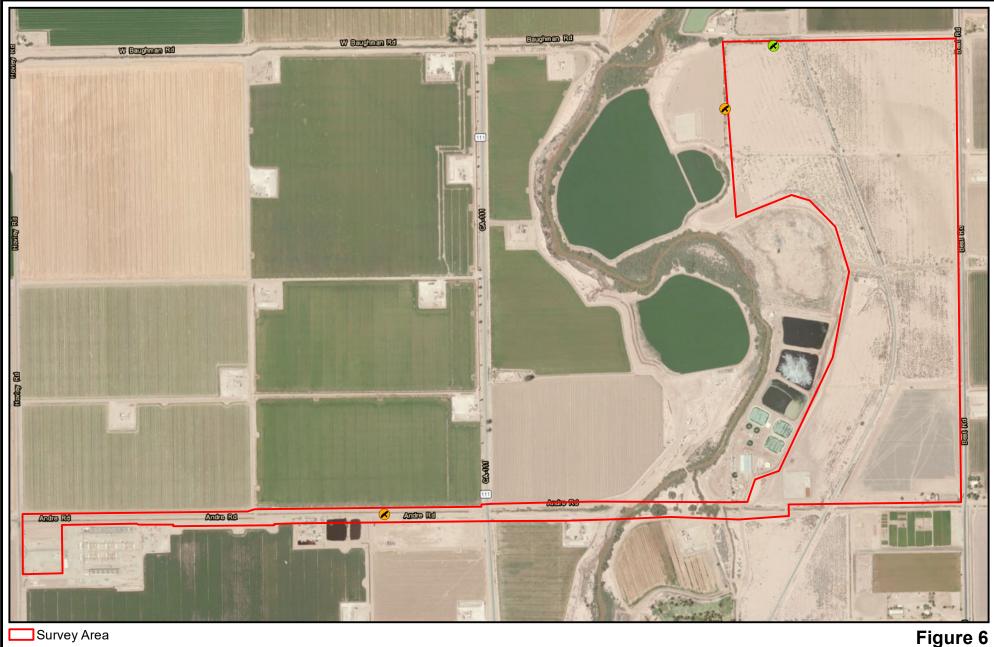
No sensitive plant species were observed during the survey effort. A complete list of plants observed is provided in Appendix B.

3.7 GENERAL WILDLIFE

A total of 39 wildlife species were observed during the survey. Wildlife species observed or detected during the survey were characteristic of the existing Project site conditions. One California Species of Special Concern, loggerhead shrike, and two California watch list species, black-tailed gnatcatcher

Biological Technical Report for the Brawley Solar Project Imperial County, California

(*Polioptila melanura*) and ferruginous hawk (*Buteo regalis*) were observed within the Project site. A complete list of wildlife observed is provided in Appendix C.



Species Observations

Loggerhead Shrike

Northern Harrier

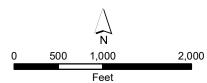


Figure 6
Brawley Solar
Sensitive Species Observations

SECTION 4.0 – CONCLUSIONS AND RECOMMENDATIONS

4.1 SENSITIVE PLANTS

After the literature review, the assessment of the various habitat types in the Project site, and the reconnaissance survey were conducted, it was determined that 4 sensitive plant species are considered absent from the Project site and 1 special status plant has a low potential to be present.

Abram's spurge has a low potential to occur. However, low quality habitat for this species occurs within the Project site and it has not been recorded within 3 miles of the site in the last 25 years. Therefore, no impacts to these species are anticipated to occur due to Project related activities.

4.2 SENSITIVE WILDLIFE

Of the 23 sensitive wildlife species identified in the literature review, it was determined that 17 sensitive wildlife species were considered absent from the Project site. Three species have a low potential to occur, two species have a high potential to occur, and one species was present within the Project site.

Flat-tailed horned lizard, short-eared owl, and western yellow bat have a low potential to occur. However, low quality habitat for these species occurs within the Project site; and none of these species have been recorded within the site within the last 25 years. Therefore, no impacts to these species are anticipated to occur as a result of Project activities.

Burrowing owl and mountain plover are considered to have a high potential to occur within the Project site. Two loggerhead shrikes were observed within the Project site. In order to minimize potential impacts to these species, a pre-construction survey should be conducted no more then 30 days prior to the start of construction activities. If any of these species are observed during the pre-construction survey, CDFW should be notified immediately; and an appropriate avoidance buffer should be established and measures to avoid or minimize impacts to the species should be submitted to CDFW for approval prior to construction. In addition, a biological monitor is recommended to be present during all construction activities occurring within 150 feet of wintering mountain plover or nesting loggerhead shrike and 500 feet of nesting burrowing owl.

4.3 JURISDICTIONAL WATERS

Several jurisdictional features were observed within the Project site. However, the project has been designed to avoid impacts to waters of the State and waters of the U.S.

The ICFD Fire Prevention Bureau requires two points of emergency access for the Project, including two separate ingress/egress routes to access the west side of the railroad tracks running north/south through the center of the Project. Three access points will be available to access the Project site including: primary access located in the middle of Best Avenue, a secondary construction access located in the southeast corner, and an emergency access located in the northwest corner. The emergency access route from the northwest portion of the Project site will be designed to cross a non-jurisdictional agricultural ditch. Potential access route options include converting a non-vegetated portion of an open cement culvert to a corrugated metal pipe (CMP) or a closed concrete pipe of similar size and establishing an access road above the pipe. Native quail bush and non-native tamarisk and Mexican palo verde are located within the

irrigation ditch. It is recommended the access routes be constructed in an area that will avoid or minimize impacts to native vegetation found within the irrigation ditch.

No impacts to waters of the State and/or waters of the US are anticipated. However, if impacts to waters of the State and/or waters of the US are unavoidable as the Project designs are finalized, a USACE 404 permit, State 401 certification, and/or State Lake and Streambed Alteration Agreement may be required for Project authorization. If permits are required for Project authorization, mitigation for impacts will be determined through coordination with the agencies during the permit application process. Prior to construction, installation of Best Management Practices should be installed for water quality and erosion control measures to minimize/avoid potential impacts. A biological monitor should be present prior to initiation of ground disturbing activities to demark limit of disturbance boundaries. Flagging and/or staking should be used to clearly define the work area boundaries and avoid impacts to adjacent native communities.

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APPENDIX A – SITE PHOTOGRAPHS

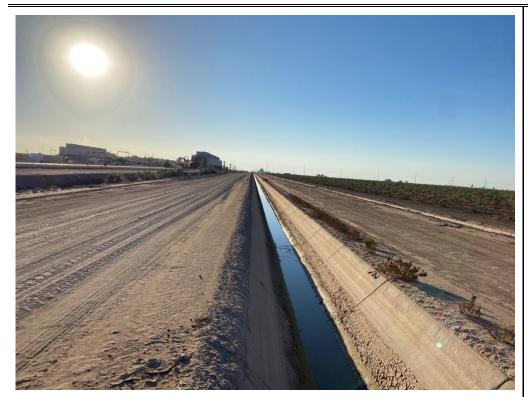


Photo 1. Photo of the western end of the Spruce Three Drain, non-vegetated, jurisdictional feature which runs parallel with the forested wetland jurisdictional feature just south of it. Photo is facing west.



Photo of the eastern end of the Spruce Three Drain, forested shrub wetland, jurisdictional feature. The vegetation community consists of Riparian scrub. Photo facing east.

Photo 2.



Photo 3.

Overview of the New River that cuts diagonally through the Project site.
The vegetation community is undisturbed Mediterranean Tamarisk.
Photo is facing



Photo 4.

southeast.

Overview of a man-made ditch leading into a culvert just north of the Livesley Drain. The area above the drainage is a disturbed vegetation community of Cattle Spinach. Photo is facing northwest.



Overview of the Ornamental Landscaping just north of the Livesley Drain. The vegetation community is agricultural Bermuda grass. There is a manmade ditch surrounding it. Photo is facing north.



Overview of the undisturbed scrub/chaparral vegetation community on the south side of the Project site. This area also contains a man-made culvert. Photo is facing northeast.

Photo 6.



Photo 7. Overview of the southeast corner of the Project site. There is a strip of barren land and above that is the agricultural Bermuda grass. South of the barren land is the Livesley Drain. Photo is facing

northeast.



Photo 8.

Photo of a house as well as the vegetation community of Paloverde and Honey Mesquite in the southeast corner of the Project site. Photo is facing west.



Photo 9.

Photo showing the man-made ditch, in the middle of the Project site, that leads to a culvert. South of the ditch is agricultural Bermuda grass and to the north of the ditch is agricultural Alfalfa. Photo is facing west.



Photo 10.

Photo of the culvert, in the middle of the Project site, that the manmade ditch leads into.
Photo is facing east.



Photo 11.

Overview of the northeast side of the Project site. To the east is bare ground, and to the west is a strip of mainly Mediterranean Tamarisk. A man-made ditch runs through it. Photo is facing north.



Photo 12.

Photo of a culvert that is in the center of the north side of the Project site. It is surrounded by mainly bare ground with man-made ditches running through. Photo is facing north.



Photo 13.

Photo showing the southwest corner of the north side of the Project site. There is a culvert and disturbed bare ground. Photo is facing southeast.



Photo 14.

Overview of the bare ground on the northwest side of the Project site. Photo is facing east.



Photo 15.

Overview of the wetland area in the northwest corner of the Project site.
Photo is facing north.

APPENDIX B – PLANT SPECIES OBSERVED

Scientific Name	Common Name	
ANGIOSPERMS (EUDICOTS)		
AMARANTHACEAE	AMARANTH FAMILY	
Amaranthus sp.	pigweed	
Amaranthus biltoides	prostrate pigweed	
Suaeda nigra	bush seepweed	
ASTERACEAE	SUNFLOWER FAMILY	
Chloracantha spinosa	spiny chlorocantha	
Pluchea sericea	arrow weed	
BORAGINACEAE	BORAGE FAMILY	
Heliotropium curassavicum	salt heliotrope	
BRASSICACEAE	MUSTARD FAMILY	
Brassica tournefortii*	Sahara mustard	
CHENOPODIACEAE	GOOSEFOOT FAMILY	
Atriplex lentiformis	quail bush	
Chenopodium album*	lamb's quarters	
FABACEAE	LEGUME FAMILY	
Medicago sativa	alfalfa	
Parkinsonia aculeata	Mexican palo verde	
Prosopis glandulosa	honey mesquite	
TAMARICACEAE	TAMARISK FAMILY	
Tamarix ramosissima*	Mediterranean tamarisk	
ZYGOPHYLLACEAE	CALTROP FAMILY	
Larrea tridentata	creosote bush	
ANGIOSPERMS (MONOCOTS)		
POACEAE	GRASS FAMILY	
Cynodon dactylon	Bermuda grass	
Distichlis spicata	saltgrass	
Schismus barbatus*	Mediterranean schismus	
TYPHACEAE	CATTAIL FAMILY	
Typha sp.	cattail	
*Non-Native Species		

APPENDIX C – WILDLIFE SPECIES LIST

Scientific Name	Common Name	
CLASS REPTILIA	REPTILES	
PHRYNOSOMATIDAE	ZEBRA-TAILED, EARLESS, FRINGE-TOED, SPINY, TREE, SIDE-BLOTCHED, AND HORNED LIZARDS	
Sceloporus occidentalis	western fence lizard	
CLASS AVES	BIRDS	
PODICIPEDIDAE	GREBES	
Aechmophorus clarkii	Clark's grebe	
PHALACROCORACIDAE	CORMORANTS	
Phalacrocorax auritus	double-crested cormorant	
ARDEIDAE	HERONS, BITTERNS	
Egretta thula	snowy egret	
THRESKIORNITHIDAE	IBISES	
Plegadis chihi	white-faced ibis	
ANATIDAE	DUCKS, GEESE, SWANS	
Anas platyrhynchos	mallard	
CATHARTIDAE	NEW WORLD VULTURES	
Cathartes aura	turkey vulture	
ACCIPITRIDAE	HAWKS, KITES, EAGLES	
Buteo jamaicensis	red-tailed hawk	
Circus cyaneus	northern harrier	
FALCONIDAE	FALCONS	
Falco columbarius	merlin	
Falco sparverius	American kestrel	
ODONTOPHORIDAE	NEW WORLD QUAIL	
Callipepla gambelii	Gambel's quail	
RALLIDAE	RAILS, GALLINULES, COOTS	
Fulica americana	American coot	
CHARADRIIDAE	PLOVERS	
Charadrius vociferus	killdeer	
RECURVIROSTRIDAE	STILTS & AVOCETS	
Himantopus mexicanus	black-necked stilt	
SCOLOPACIDAE	SANDPIPERS	
Calidris minutilla	least sandpiper	
Tringa semipalmata	willet	
Limnodromus griseus	short-billed dowitcher	
Limnodromus scolopaceus	long-billed dowitcher	
COLUMBIDAE	PIGEONS & DOVES	
Streptopelia decaocto	Eurasian collared-dove	
Zenaida macroura	mourning dove	

Scientific Name	Common Name
PICIDAE	WOODPECKERS
Colaptes auratus	northern flicker
TYRANNIDAE	TYRANT FLYCATCHERS
Sayornis nigricans	black phoebe
Sayornis saya	Say's phoebe
Pyrocephalus rubinus	vermilion flycatcher
HIRUNDINIDAE	SWALLOWS
Hirundo rustica	barn swallow
Tachycineta thalassina	violet-green swallow
REMIZIDAE	VERDINS
Auriparus flaviceps	verdin
TROGLODYTIDAE	WRENS
Salpinctes obsoletus	rock wren
Troglodytes aedon	house wren
POLIOPTILIDAE	GNATCATCHERS
Polioptila caerulea	blue-gray gnatcatcher
Polioptila melanura	black-tailed gnatcatcher
MIMIDAE	MOCKINGBIRDS, THRASHERS
Mimus polyglottos	northern mockingbird
LANIIDAE	SHRIKES
Lanius Iudovicianus	loggerhead shrike
PARULIDAE	WOOD WARBLERS
Setophaga nigrescens	black-throated gray warbler
Geothlypis trichas	common yellowthroat
ICTERIDAE	BLACKBIRDS
Agelaius phoeniceus	red-winged blackbird
Sturnella neglecta	western meadowlark
Quiscalus mexicanus	great-tailed grackle
FRINGILLIDAE	FINCHES
Haemorhous mexicanus	house finch

Brawley Solar Project – Geotechnical Feasibility Study

Ormat Nevada, Inc.



February 8, 2021

Alissa Sanchez Ormat Nevada, Inc. 801 Main Street Centro, CA 92243

Subject: Geotechnical Feasibility Study Applicability

Dear Ms. Sanchez,

Petra Geosciences, Inc. prepared a Geologic/Geotechnical Feasibility Study for the Brawley Solar Project (proposed Project) on February 3, 2011. This study analyzed the Project Site in its entirety.

On February 3, 2021, Chambers Group reached out to Alan Pace, one of the prepares of the original feasibility study to confirm that the findings in the previously prepared report have not meaningfully changed. Mr. Pace responded with: "Petra conducted a feasibility-level investigation for the Brawley Solar Facility project. Petra Job No. 320-10 dated February 3^{rd,} 2011. The conditions noted in the 2011 study have not significantly changed since the preparation of this email."

Based on geological conditions and confirmation from Petra Geosciences, the February 3, 2011 Geologic/Geotechnical Feasibility Study would still apply to the proposed Project and could and should be used during CEQA compliance to describe the existing conditions and potential impacts from the Project to the environment specific to geology and soils.

If you have any questions, please do not hesitate to contact Project Manager, Victoria Boyd at (760) 685-4838 or vboyd@chambersgroupinc.com.

Sincerely,

CHAMBERS GROUP, INC.

Wictoria Bush

Victoria Boyd Project Manager





Riverside County

38655 Sky Canyon Drive, Suite A Murrieta, California 92563 951-600-9271





past + present + future it's in our science

> Engineers, Geologists Environmental Scientists

February 3, 2011 J.N. 320-10

Mrs. Charlene Wardlow ORMAT 6225 Neil Road Reno Nevada, 89511

Subject:

Geologic/Geotechnical Feasibility Study; Brawley 190-Acre Photovoltaic Site, Located Approximately 2 ½ miles Northwest of the City of Brawley, Imperial County, California

Dear Mrs. Wardlow;

Petra Geotechnical, Inc. (Petra) is pleased to submit this geologic/geotechnical feasibility report for the subject photovoltaic (PV) site located at the northwest corner of Best and Ward Roads in the Brawley area of Imperial County, California. Figure 1 depicts the site location with respect to the surrounding area. As we understand, the proposed development will consist of a solar farm and associated improvements such as access roads and maintenance buildings. In addition to the solar farm, the ultimate development is understood to include six geothermal wells and appurtenant facilities. The purpose of this study is to obtain available geotechnical and geologic information on the nature of the current soil conditions and to evaluate the potential geologic hazards or constraints that may impact the development of the subject property, specifically with respect to the PV solar farm. Geotechnical and geologic issues pertaining to the development of the geothermal wells and facilities will be addressed in a separate report.

This report presents the findings and opinions regarding the feasibility of the proposed project with respect to the geologic and geotechnical factors that may impact site development. This report is based on review of available geologic maps and data, site reconnaissance, and drilling and sampling of near surface soils for preliminary laboratory testing. This work was performed in accordance with our Proposal No. 1260-10, dated August 5, 2010.

LOCATION AND SITE DESCRIPTION

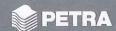
The subject site consists of approximately 190 acres within the northern part of the Imperial Valley, Imperial County, California, approximately 2.5 miles north of the town of Brawley (see Figure 1). The project site is

accessed by a dirt road in the central portion of the site, adjacent to Best Road. This road is also currently utilized for access to the waste water treatment plant to the southwest. The property is bounded by the paved Best Road to the east, by the unpaved Ward Road and an active drainage channel to the south, by another active drainage channel to the north, and by several ponds related to an existing waste water treatment plant to the west. The western property boundary is delineated by an approximately 20- to 30-foot high natural slope that descends to the treatment ponds. The New River is also located just west of the property. Vacant farmed property is generally located to the south, east and north. During our site investigation, a contractor was observed constructing pipelines in the southern portion of the site.

The topography of the site is nearly level to very gently sloping to the south-southwest at an approximate elevation of 140 to 150 feet below mean sea level (msl). The surface of the majority of the site is currently in a farmed/tilled condition; however some areas are also covered with a light to heavy growth of brush and several stands of small trees. Notable improvements with the property included several abandoned buildings in the southeast corner of the site and along the eastern property line near the center of the site. Although not observed, underground storage tanks may also be present in the vicinity of these structures. A north-south trending Pacific Railroad easement bisects the central portion of the property. Existing above-ground steel pipelines are located just east of the rail lines and near the eastern property line in the southeast quadrant of the site. Several dirt paths and abandoned concrete-lined irrigation V-ditches are also located throughout the site. Overhead electric/utility poles are present along the eastern and northern property lines. The irrigation channel along the southern property line is unlined, however the channel along the northern properly line is concrete-lined and eventually drains into an underground culvert-type structure located near the property line several hundred feet south of the northwest property corner.

FIELD EXPLORATION AND LABORATORY TESTING

Our site reconnaissance and subsurface exploration program was performed under the direction of an engineering geologist from Petra on December 2, 2010. The exploration involved the excavation of four 8-inch diameter exploratory hollow-stem auger borings to a maximum depth of approximately 51.5 below existing grade (Borings B-1 through B-4). Earth materials encountered within the exploratory borings were classified and logged by an engineering geologist in accordance with the visual-manual procedures of the Unified Soil Classification System. The approximate locations of the exploratory borings are shown on Figure 2 and descriptive logs are presented in Appendix A.



Disturbed bulk samples and relatively undisturbed ring samples of soil materials were collected for classification, laboratory testing and engineering analyses. Disturbed bulk samples were collected from the drill rig cuttings and sealed in plastic bags for transport to our in-house laboratory. Undisturbed samples were obtained using a 3-inch outside diameter modified California split-spoon soil sampler lined with brass rings. The soil sampler was driven with successive 30-inch drops of a free-fall, 140-pound automatic trip hammer. The central portions of the driven-core samples were placed in sealed containers and transported to our laboratory for testing. The number of blows required to drive the split-spoon sampler 18 inches into the soil were recorded for each 6-inch driving increment; however, the number of blows required to drive the sampler for the final 12 inches was noted in the boring logs (Appendix A) as *Blows per Foot*.

To provide a preliminary evaluation the engineering properties of the near surface soils underlying the subject site, select laboratory tests were performed on samples considered representative of the materials encountered. Preliminary laboratory tests included the determination of in-situ moisture content and dry density, expansion potential, soluble sulfate and chloride content, pH, and minimum resistivity. A description of laboratory test procedures and summaries of the test data are presented in Appendix B and the moisture/density test data is included on the borings logs in Appendix A.

FINDINGS

Regional Geology

The proposed solar farm site is located within northern portion of the Imperial Valley, which is part of the Salton Trough geomorphic province of California. The Salton Trough encompasses the Coachella, Imperial and Mexicali Valleys, which extend from northeast of Palm Springs near San Gorgonio Pass to the Gulf of California. The geologic structure of the trough is a result of extensional forces within the earth's crust. The Imperial Valley is bounded by the Chocolate Mountains to the northeast, the Salton Sea to the north, the Peninsular Ranges to the southwest, and Mexicali Valley to the south. Lacustrine and alluvial sediments are the dominant geologic units of the Imperial Valley. Unexposed succession of Tertiary- and Quaternary-aged sedimentary rocks lies below the alluvial and lake sediments ranging in depth from 11,000 feet or more at the margins to more than 20,000 feet in the central portion of the Salton Trough. Basement rocks consisting of Mesozoic granite and probably Paleozoic metamorphic rocks are estimated to exist at depths between 15,000 and 20,000 feet.

The watershed of the Salton Trough empties into the Salton Sea at the lowest part of the basin. This basin was



periodically filled with water to form the ancient Lake Cahuilla, depending on which side of its delta the Colorado River would drain. The sediments of the delta form a topographic high that separates the Salton basin, which is below sea level, from the Gulf of California.

Local Geology and Subsurface Conditions

The site is essentially within the floodplain of the New River and is generally underlain by Quaternary lake deposits. The western boundary of the site (descending slope) is the former bank of the New River. In addition a topsoil/tilled horizon and minor amounts of undocumented artificial fill were observed at the surface of the site and the soil units are discussed as follows.

Undocumented artificial fill on the site is related to the boundary roads and paths, the adjacent drainage channels, and the railway that bisects the site. The fill within these areas consists of local lean to fat clay derived from the native lake deposits, described below. The surface of the vast majority of the property is mantled by a 1-to 1.5-foot thick horizon of topsoil and/or tilled soil related to the previous agricultural usage. These soils are predominantly silts and clays.

Young lake deposits are the dominant geologic unit below the site. Based on the data obtained from the borings, the predominate soil types consist of silts and clays with occasional interbeds of silty sand.

Seismic Setting

The Salton Trough is a seismically active area and in particular within the Imperial Valley with numerous northwest-trending active faults. The closest active faults in proximity to the site include: the Brawley Seismic Zone, approximately 2.4 miles to the west; the Imperial fault, approximately 8.3 miles to the south; the Superstition Hills fault, approximately 11.9 miles to the southwest; the Superstition Mountain fault, approximately 14.5 miles to the southwest; the Elmore Ranch fault, approximately miles 15.8 to the west; and the San Andreas fault zone, approximately 25.5 miles to the northwest. An "active" fault is defined as a fault that has had displacement within the Holocene epoch, or last 11,000 years. A "potentially active" fault is a fault that does not have evidence of movement within the last 11,000 years, but has moved within the last 1.6 million years.

The site is not located within a *Fault Hazard Zone*, as defined by the state of California in the Alquist-Priolo Earthquake Fault Zoning Act and no faults are know to project through the project site.



Groundwater

Groundwater was encountered at approximately 42 feet below existing grade at B-1 in the western end of the site and perched groundwater was encountered at approximately 12 feet below grade at B-4 in the northeast corner of the site. In addition water is channeled within the drainage ditches/channels along the northern and southern property lines just below the surface elevation of the site.

GEOLOGIC HAZARDS

The following section discuses various potential geologic hazards with respect to the proposed 190-acre solar farm site. The issues addressed include fault ground rupture, strong seismic shaking, liquefaction and other earthquake-induced ground hazards, slope stability, subsidence and flooding.

Fault Rupture

The site is not located within a currently designated State of California Alquist-Priolo Earthquake Fault Zone (Hart, 1999). In addition, no known active faults have been identified on the site. While fault rupture would most likely occur along previously established fault traces, fault rupture could occur at other locations. However, the potential for active fault rupture at the site is considered to be very low

Seismic Shaking

The site is located within an active tectonic area with several significant faults capable of producing moderate to strong earthquakes. The Imperial fault, the Superstition Hills fault and the Superstition Mountain fault are all in close proximity of the site and capable of producing strong ground motions. Historically, the Imperial fault generated the 1979 and 1940 earthquakes and the Elmore Ranch fault generated the November 23, 1987 earthquake that is thought to have triggered the November 24, 1987 earthquake that occurred on the Superstition Hills and Wienert faults. Table 1 lists select recorded earthquakes felt at the site area.

Based on probabilistic analysis from the California Geological Survey web site, the peak ground acceleration at the site is estimated to be approximate 0.48g, based on a probability of 10 percent in 50 years.



<u>TABLE 1</u> Significant Historic Earthquakes

Earthquake Events	Moment Magnitude (Mw)
El Mayor/Cucapah Mexicali (April 4, 2010)	7.2
Superstition Hills (Nov. 24, 1987)	6.6
Elmore Ranch (Nov. 23, 1987)	6.2
Mexicali (June 9, 1980)	6.1
Imperial Valley (Oct. 15, 1979)	6.4
Borrego Mountain (April 8, 1968)	6.5
Imperial Valley (May 18, 1940)	6.9
Laguna Salada (Feb. 23 1892)	7.0

Liquefaction Potential

Loosely compacted/deposited granular soils located below the water table can temporarily loose strength through the process of liquefaction during strong earthquake-induced ground shaking. When solid particles in a saturated soil consolidate into a tighter package as a result of vibration due to an earthquake, the non-compressible pore water between the particles will be squeezed out. If the soil has a high permeability, a sufficient amount of water will drain out of the pores to maintain inter-granular stresses and, thereby, the soil's shear strength. However, if the permeability is relatively low, then the water will not drain away quickly enough and pore water pressures will build as a result. If the pore water pressure rises to a level such that the shear strength of the soil becomes zero, then liquefaction is said to have occurred. Factors known to influence liquefaction potential include soil type and depth, grain size, relative density, ground-water level, degree of saturation, and both intensity and duration of ground shaking.

Based on our observations of site soils encountered during drilling the exploratory borings, the potential for liquefaction at the site is considered to be very low. This is based on the predominate types of soils encountered in the borings, fine-grained silts and clays, and the lack of a shallow groundwater table. However, additional analysis is warranted during the design level geotechnical investigation of the site to evaluate the



potential for differential settlement during a major seismic event.

Secondary Effects of Seismic Activity

Secondary effects of seismic activity normally considered as possible hazards to a site include several types of ground failure, as well as earthquake-induced flooding. Various general types of ground failures, which might occur as a consequence of severe ground shaking at the site, include landsliding, ground subsidence, ground lurching and lateral spreading. The probability of occurrence of each type of ground failure depends on the severity of the earthquake, distance from faults, topography, subsoils and groundwater conditions, in addition to other factors. Based on the site conditions and gentle to relatively flat topography across the majority of the site, landsliding, ground subsidence, ground lurching and lateral spreading are considered unlikely at the site.

Seismically induced flooding that might be considered a potential hazard to a site normally includes flooding due to tsunami or seiche (i.e., a wave-like oscillation of the surface of water in an enclosed basin that may be initiated by a strong earthquake) or failure of a major reservoir or retention structure upstream of the site. No major reservoir is located near, or upstream of the site so the potential for seiche or inundation is considered negligible. Because of the inland location of the site, flooding due to a tsunami is also considered negligible at the site.

Landslides and Slope Instability

No landslides exist within or near the site. Based on the relatively flat topography across the site and areas to the north, east and west of the site, the potential for landsliding is considered negligible. However there is a potential for general slope instability within the descending slope along the western boundary of the site. The southern portion of this slope appears to have been recently graded, however the northern portion appears to be natural and also in a somewhat over-steepened condition. In addition we observed some minor slumping within localized areas of this natural descending slope as well as several other areas that are heavily eroded. Based on the topography of the site, runoff water is allowed to freely drain over the top of this slope. A detailed site plan showing the existing topography was not available at the time of this study, however we tentatively estimate this slope to be approximately 20 to 30 feet in height.

Areal Subsidence

The site is not known to be located in an area with potential for ground subsidence due to withdrawal of fluids.



Flooding and Erosion

Sheet flooding and local erosion may be possible at this site. The site is mapped within Zone X by FEMA's Flood Insurance Rate Maps indicating the area has a low to moderate risk.

Expansive Soils

Expansive soils generally result from specific clay minerals that expand in volume when saturated and shrink in volume when dry. Expansive soils can severely impact the performance of slabs or structures with shallow foundations. Expansive soils are know to be present throughout the Imperial Valley and our preliminary laboratory testing encountered medium to highly expansive soils within the upper 5 feet of the project site.

Preliminary Soil Corrosivity Screening

As part of this investigation, a representative sample of near-surface soils was subjected to several screening tests in order to provide a general assessment of soil corrosivity. The results of these tests are provided in Appendix B.

The following sections of this report present our geotechnical engineering interpretation of current codes and specifications that are commonly used in our industry in conjunction with limited laboratory testing for corrosive potential. It should be noted that Petra Geotechnical, Inc. does not practice corrosion engineering; therefore, the opinions and engineering judgment provided herein should be considered as general guidelines only. It is recommended that the project design professional (i.e., the architect and/or structural engineer) consider retaining a qualified corrosion engineer to conduct additional sampling and testing of near-surface soils during the final stages of site grading to provide a complete assessment of soil corrosivity. Recommendations to mitigate the detrimental effects of corrosive soils on concrete and buried metallic building materials (such as copper and ductile iron) placed in contact with site soils should be provided by the corrosion engineer as deemed appropriate.

<u>Soluble Sulfate and Soil pH</u> - The results of our laboratory testing performed in accordance with California Test Method No. 417 indicate onsite near-surface soils contain a water-soluble sulfate content of 0.267 percent. According to Table 4.2.1 of the ACI 318-08, the soils are thus categorized as Exposure Class S2 with respect to soluble sulfates and, therefore, a **Severe** exposure to sulfates may be expected for concrete placed in contact with these soil materials.



Based on section 1904.3 of the 2010 CBC, concrete that will be exposed to sulfate-containing soils shall comply with the provisions of the American Concrete Institute (ACI) Standard 318-05, Section 4.3. According to Table 4.3.1 of the ACI 318-05, to reduce the potential for concrete deterioration, sulfate resistant cement should be used in all concrete that may be in contact with on-site soils. Further, careful control of the maximum water-cement ratio and the minimum concrete compressive strength is also necessary in order to provide proper resistance against deterioration due to sulfates.

For concrete that is expected to have a Severe exposure to sulfates, Table 4.3.1 of ACI Standard 318-05 indicates that Type V cement should be used, and that the maximum water-cement ratio should not exceed 0.45. In addition, the concrete compressive strength should not be less than 4,500 pounds per square inch.

<u>Soluble Chloride</u> - The results of tests performed in accordance with California Test Method No. 422 indicate that onsite soils contain water-soluble chloride concentrations on the order of 262 parts per million (ppm). According to Table 4.2.1 of the ACI 318-08, concrete that is exposed to moisture but not to external sources of chloride should be categorized as Exposure Class Low with respect to chlorides and, therefore, a Low exposure to chlorides may be expected for concrete placed in contact with the onsite soil materials.

Section 1904.4 of the 2010 CBC requires that reinforcement in concrete be protected from exposure to chlorides in accordance with Section 4.4 of ACI 318; however, Section 4.4 of ACI 318-08 is related to freeze-and-thaw conditions that are not applicable to the subject project. Therefore, no protection against chloride content is expected to be required. Further, according to Table 8.22.1 of Caltrans BDS no minimum concrete cover is specified when chloride concentration is less than 500 ppm.

Resistivity - The minimum soil resistivity was determined in accordance with California Test Method No. 643 and was found to be 120 ohm-cm. This result indicates that onsite soils are severely corrosive to ferrous metals and copper. As such, any ferrous metal or copper components of the proposed buildings within the site (such as cast iron pipes, ductile iron pipes, copper tubing, etc.) that are expected to be buried in direct contact with site soils need to be protected against the detrimental effects of severely corrosive soil materials.



CONCLUSIONS AND RECOMMENDATIONS

General Feasibility

Based on our preliminary assessment of potential geologic hazards and soil conditions, development of the subject property is considered feasible for a geotechnical standpoint. We recommend that a detailed geotechnical investigation be conducted when site plans are developed to prepare site specific grading and foundation recommendations that are appropriate for the proposed construction. However, there are several geologic/geotechnical issues that require consideration for the development of the proposed project and are discussed further below.

Slope Stability

Based current conditions of the existing descending slope along the western property boundary, there is a potential for slope instability. Based on the intended use of the site, grading of this slope is not considered cost effective or necessary. At this time we recommend that any permanent structural improvements near the top of slope along the western property line be tentatively setback by a 3:1 (horizontal: vertical) projection from the existing toe-of-slope. This would include the placement of geothermal wells. Non-permanent structures such as access roads and fencing would be permitted within this zone. Based on our observations we anticipate the slope to be on the order of 20 to 30 feet in height, therefore a 60- to 90-foot setback would be warranted. In addition we recommend that an earthen drainage berm be constructed along the top of this slope to prevent surface water from flowing over this slope and to channel any water towards the appropriate drainage facilities. We recommend that a more detailed slope stability analysis be performed during the subsequent design phase geotechnical investigation.

Liquefaction Potential

Although there is a very low potential for earthquake-induced liquefaction to affect the site, further evaluation and analysis is warranted during the design phase geotechnical investigation to confirm that no specialized foundation design is needed.

Aerial Subsidence

The general area is not experiencing subsidence that would typically be attributed to the extraction of groundwater. The solar farm is not expected to exacerbate or otherwise trigger significant subsidence. However, the operation of six geothermal wells throughout the site could potentially result in subsidence if large quantities of groundwater are extracted with a resulting lowering of the water table. Because the



specifics of the geothermal process and their impact on the groundwater levels are not a part of this study, the issue of potential subsidence related to the operation geothermal wells should be addressed.

Solar Panel Foundations

The soil conditions are such that the proposed solar panels may be supported on a variety of foundation systems. The near surface native soils were observed to consist primarily of clay and silt. Results of our laboratory testing indicate that near surface onsite soils exhibit an Expansion Index ranging from 72 to 102 (a medium to high expansion potential). These soils should thus be considered as "Expansive" per Section 1803.5.3 of the 2010 California Building Code (CBC).

The foundation system for the proposed solar panels is anticipated to consist of cast-in-drilled-hole (CIDH) concrete piles supporting steel pipe columns. Remedial grading is generally not required, as piles may be drilled to various depths to accommodate the vertical and lateral capacities needed. Test piles will be required to verify design vertical bearing capacities, both down-force and pullout, and lateral bearing capacity.

Other possible foundation systems could include conventional shallow spread footings and a variety of deep foundations, driven steel piles, and drilled helical anchors. Each of these foundation types has both merits and drawbacks with respect to ease and speed of installation, and cost.

More detailed geotechnical studies will be required to more fully evaluate the final foundation recommendations, or if other foundation options are considered.

Equipment Slabs

Portland Cement Concrete (PCC) slabs will be used for support of appurtenant structures, such as Inverter Transformers and PV Interconnection Switch Gear. Conventional spread footings or structural slabs are assumed for the support of these slabs. Due to the variable density of the near surface soils, an anticipated over-excavation that will provide a three-foot blanket of fill below proposed bottom of footing, extending laterally a minimum of five feet beyond the footprint of the slabs should be assumed. Localized regions may be encountered which require a deeper over-excavation. The excavated alluvial soils are anticipated to be suitable for use as compacted fill beneath the equipment slabs, provided any deleterious materials (vegetation, rocks in excess of 6 inches in largest dimension, etc.) are removed: however, if used, expansive soil will have to be considered in the foundation/slab design. Consideration should also be given to replacement of the slab



subgrade soils with select non-expansive materials.

Corrosive Soils

Results of our preliminary laboratory screening tests indicate that near surface onsite soils are considered severely corrosive to both concrete materials and metallic elements. Petra does not practice corrosion engineering; therefore a qualified corrosion specialist should be consulted to mitigate severely corrosive soils.

Strong Seismic Related Ground Motions

The site is located in a seismically active area of Southern California and will likely be subjected to very strong seismically-related ground shaking during the anticipated life span of the project. Structures within the site should therefore be designed and constructed to resist the effects of strong ground motion in accordance with the provisions of the 2010 CBC.

Conduit Trenches

We anticipate that the solar panels will be connected by buried conduit. Most of the alluvial deposits at the site should present little difficulty with regard to conduit installation, anticipated to be approximately 2 feet deep. On-site soils may be used as trench backfill. Due to the poor drainage characteristics of the soils, buried conduit may be subject to saturated conditions during the lifetime of the proposed solar facility. The thermal conductivity of the on-site soils and anticipated bedding materials should be evaluated in the design of the conduit trenches with respect to heat dissipation.

Flooding and Drainage

The potential for localized flooding may exist within the site. A detailed drainage study should be performed by the project civil engineer.

Additional Work

As previously stated, this study addresses the general feasibility of the proposed photovoltaic site with respect to geologic and geotechnical constraints. Additional studies are recommended to more thoroughly address specific aspects of the development, such as remedial grading and foundation design.

REPORT LIMITATIONS

This report is based on the existing condition of the subject property and the preliminary geologic/geotechnical field data as described herein. The materials encountered within the project site and utilized in our preliminary laboratory testing are believed representative of the total project area, and the conclusions and



recommendations contained in this report are presented on that basis. However, soils can vary in characteristics between points of exploration, both laterally and vertically, and those variations could affect the conclusions and recommendations contained herein. As stated, when site plans have been developed, additional subsurface investigation and geotechnical testing and analysis, will be necessary. This report has been prepared consistent with that level of care being provided by other professionals providing similar services at the same locale and in the same time period. The contents of this report are professional opinions and as such, are not to be considered a guaranty or warranty.

This report should be reviewed and updated after a period of one year or if the site ownership or project concept changes from that described herein. This report has not been prepared for use by parties or projects other than those named or described herein. This report may not contain sufficient information for other parties or other purposes.

ORMATBrawley 190-Acre Site

February 3, 2011 J.N. 320-10 Page 14

We sincerely appreciate this opportunity to be of service. Please do not hesitate to call the undersigned if you have any questions regarding this report.

Respectfully submitted,

PETRA GEOTECHNICAL, INC.

Alan Pace

Associate Geologist

CEG 1952

Attachments:

References

Figure 1 – Site Location Map

Figure 2 – Exploration Location Map

Appendix A – Exploration Logs Appendix B – Laboratory Test Data Grayson R. Walker, GE Principal Engineer

GE 871

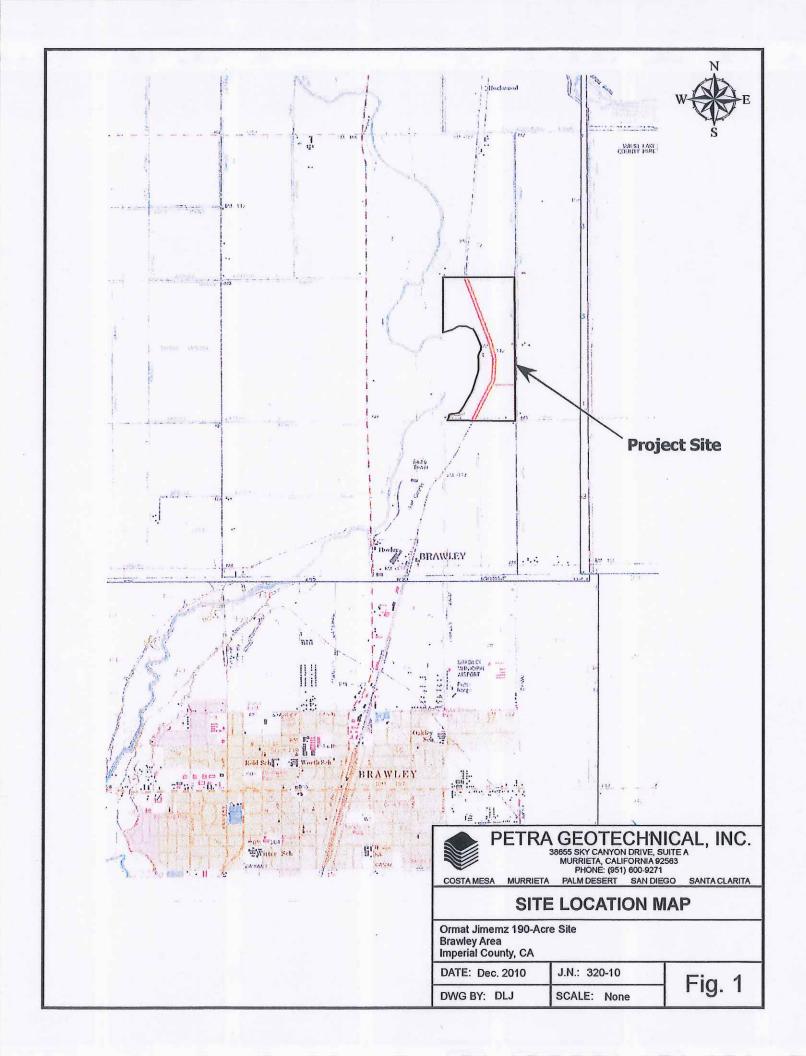
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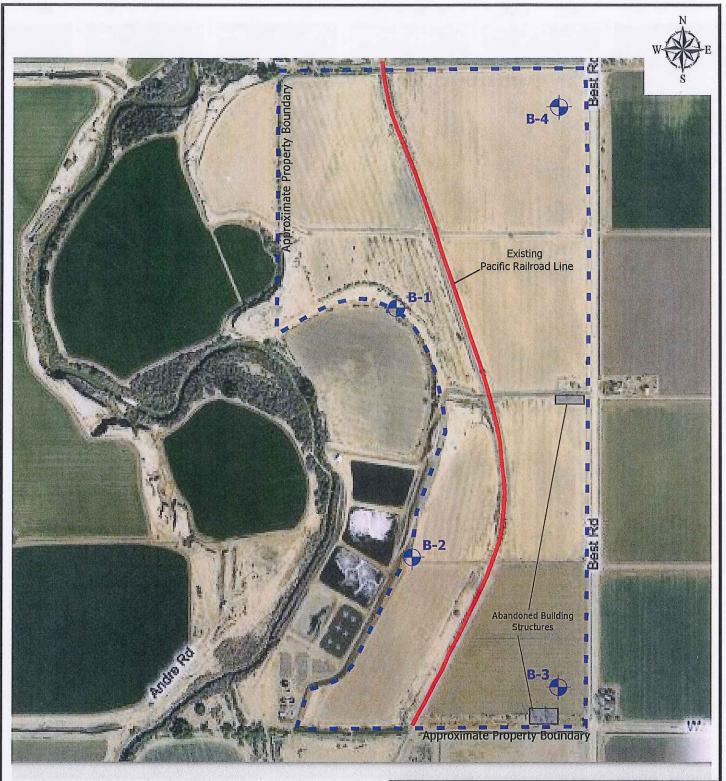
EXP. 3-31-2011

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Approximate Geotechnical Boring Location



PETRA GEOTECHNICAL, INC. 38655 SKY CANYON DRIVE, SUITE A MURRIETA, CALIFORNIA 92563 PHONE: (951) 600-9271 MURRIETA PALM DESERT SAN DIEGO SANTA CLARITA

EXPLORATION MAP

Ormat Jimemz 190-Acre Site Brawley Area Imperial County, CA

DATE: Dec. 2010

J.N.: 320-10

DWG BY: DLJ

SCALE: None

Fig. 2

APPENDIX A

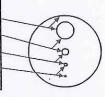


Key to Soil and Bedrock Symbols and Terms



	e)	GRAVELS	Clean Gravels	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
1 is	e E	more than half of coarse	(less than 5% fines)	GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
ials 20	oul Jes	fraction is larger than #4	Gravels	GM	Silty Gravels, poorly-graded gravel-sand-silt mixtures
		sieve	with fines	GC	Clayey Gravels, poorly-graded gravel-sand-clay mixtures
Soils f mat than sieve	than #200 > 1/2 of materials is ieve > 1/2 of materials is ieve	SANDS	Clean Sands	SW	Well-graded sands, gravelly sands, little or no fines
of of ser	eve	more than half of coarse	(less than 5% fines)	SP	Poorly-graded sands, gravelly sands, little or no fines
202 1/2 arg	SO	fraction is smaller than #4	Sands	SM	Silty Sands, poorly-graded sand-gravel-silt mixtures
^ _	/ La Sieve S		with fines	SC	Clayey Sands, poorly-graded sand-gravel-clay mixtures
si c	Stand visib	SILTS & C	CLAYS	ML	Inorganic silts & very fine sands, silty or clayey fine sands, clayey silts with slight plasticity
rials #20(U.S. article	Liquid I Less Th		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
mater than eve	200 st p			OL	Organic silts & clays of low plasticity
of r of r ler 1 si		SILTS &	CLAYS	MH	Inorganic silts, micaceous or diatornaceous fine sand or silt
smaller s	No.	Liquid		CH	Inorganic clays of high plasticity, fat clays
_ K	The	Greater T		OH	Organic silts and clays of medium-to-high plasticity
		Highly Organic Soils	man ou	PT	Peat, humus swamp soils with high organic content

Grain S	ize							
Desci	ription	Sieve Size	Grain Size	Approximate Size				
Boulders		>12"	>12"	Larger than basketball-sized				
Cobbles		3 - 12"	3 - 12"	Fist-sized to basketball-sized				
	coarse	3/4 - 3"	3/4 - 3"	Thumb-sized to fist-sized				
Gravel	fine	#4 - 3/4"	0.19 - 0.75"	Pea-sized to thumb-sized				
	coarse	#10 - #4	0.079 - 0.19"	Rock salt-sized to pea-sized				
Sand	medium	#40 - #10	0.017 - 0.079"	Sugar-sized to rock salt-sized				
Jung	fine	#200 - #40	0.0029 - 0.017"	Flour-sized to sugar-sized to				
Fines		Passing #200	<0.0029"	Flour-sized and smaller				



Labor	ratory Test Abbreviation	ns	
MAX	Maximum Dry Density Expansion Potential Soluble Sulfate Content Resistivity Acidity Consolidation Swell	MA	Mechanical (Partical Size) Analysis
EXP		AT	Atterberg Limits
SO4		#200	#200 Screen Wash
RES		DSU	Direct Shear (Undisturbed Sample)
pH		DSR	Direct Shear (Remolded Sample)
CON		HYD	Hydrometer Analysis
SW		SE	Sand Equivalent

< 1 %
1 - 5%
5 - 12 %
12 - 20 %

	Samj	pler and Symbol Descriptions
	록	Approximate Depth of Seepage
	<u></u>	Approximate Depth of Standing Groundwater
		Modified California Split Spoon Sample
		Standard Penetration Test
		Bulk Sample
The second second		No Recovery in Sampler
1		

	Can be crushed and granulated by
Soft	hand; "soil like" and structureless
Moderately Hard	Can be grooved with fingernails; gouged easily with butter knife; crumbles under light hammer blows
Hard	Cannot break by hand; can be grooved with a sharp knife; breaks with a moderate hammer blow
Very Hard	Sharp knife leaves scratch; chips with repeated hammer blows

Blows Per Foot: Number of blows required to advance sampler 1 foot (unless a lesser distance is specified). Samplers in general were driven into the soil or bedrock at the bottom of the hole with a standard (140 lb.) hammer dropping a standard 30 inches. Drive samples collected in bucket auger borings may be obtained by dropping non-standard weight from variable heights. When a SPT sampler is used the blow count conforms to ASTM D-1586

Location: T	op of Western Descendir	ng Slope (North End	1)	E	Elevation	on:	N/A				
	20-10	Client: Ormat		-	Date:		12/2/10				
	: Hollow-Stem Auger	Driving Weight:	140 lbs / 30 in		Logged	l Ru					
Dilli Method	. Honow-Stem Auger	Driving weight.	140 105 / 30 III		Sam			boratory Test	2		
Depth Lith- (Feet) ology	Ma	aterial Description		W a t e r	Blows Per Foot		Moisture Content (%)	Dry Density (pcf)	Otho Lab Test		
	LACUSTRINE DEPOSIT				1001		(7.9)	(401)			
- 1 - 2 - 3	Sandy SILT (SM): gray, dr	ayey SILT (ML): dark brownish gray, moist, hard.						99.3			
5 —	Clayey SILT (ML): dark br	ownish gray, moist, ha	rd.		54		16.2	107.1			
6					55		18.8	104.3			
8 9											
· 10 — — — · · · · · · · · · · · · · · · ·	SILT with Sand (ML): brow	wnish gray, moist, stiff	trace clay.	(e.	25		12.7	103.7			
- 14 15 16 - 17	Silty SAND (SP): pale yellograded, trace rootlets.	ow, moist, medium der	ise; fine sand, poorly		18		3.8	108.8			
- 18 - 19 - 20 - 21 - 22	CLAY (CH): dark reddish with iron staining.	gray, very moist, firm;	plastic, laminated,		11		28.8	94.4			
- 23 - 24		كأف							ATE		

				E	3 oring	No.:	B-1		
Location: To	p of Western Descending	ng Slope (North End)	E	Elevati	on:	N/A		
Job No.: 32	0-10	Client: Ormat		I	Date:		12/2/10		
Drill Method:	Hollow-Stem Auger	Driving Weight:	140 lbs / 30 in	I	Logged	By:	DLJ		
				W	Sam			oratory Tests	
Depth Lith- (Feet) ology		aterial Description		a t e r	Blows Per Foot	C B u l l e k	Moisture Content (%)	Dry Density (pcf)	Other Lab Tests
- 26 - 27 - 28 - 29 - 30 - 31 - 32 - 33 - 34 - 35 - 36 - 37 - 38 - 39 - 40 - 41 - 42 - 43 - 44 - 45 - 46	minor iron staining. Sandy SILT (ML): grayish Silty SAND (SM): grayish laminated.	brown, very moist, stiff		\\\	20 15 20 27		28.7 29.7 28.8 20.1	94.9 95.3 94.1 104.7	
- 45 —					25		24.9	101.8	

Projec	et: B	rawley - Jimemz			В	oring	No	o.:	B-1			
Locati	on: To	op of Western Descendin	g Slope (North End)		E	levati	on:		N/A			
Job No	o.: 32	0-10	Client: Ormat		Г	ate:			12/2/10			
Drill N	Method:	Hollow-Stem Auger	Driving Weight:	140 lbs / 30 in	Logged By: DLJ							
					W	Sam	_	-		oratory Test		
Depth (Feet)	Lith- ology	Ma	nterial Description		a t e r	Blows Per Foot	C o r e	u	Moisture Content (%)	Dry Density (pcf)	Othe Lab Test	
51		dark yellowish brown, satur	rated, loose.			11	/					
		Total Depth 51.5 Feet Groundwater Encountered by Groundwater at 34 Feet after Boring Backfilled with Cutt	er 10 minute wait	uring Drilling								
											ŀ	

Depth (Feet) ology ARTIFICIAL FILL (Af) SILT (ML): dry, loose. LACUSTRINE DEPOSITS (QI) Material Description t e Per r Foot e k (%) (pcf) T 40 19.1 108.1	Project: B	rawley - Jimemz			E	Boring	No.:	B-2			
Drill Method: Hollow-Stem Auger Driving Weight: 140 lbs / 30 in Logged By: DLJ Depth Lith (Feet) ology	Location: T	: 320-10 Client: Ormat ethod: Hollow-Stem Auger Driving Weight: 140 lbs / 30 in Material Description ology ARTIFICIAL FILL (Af) SILT (ML): dry, loose. LACUSTRINE DEPOSITS (QI) Clayey SILT (MH): dark gray, slightly moist, very stiff. SILT with Sand (ML): gray, dry, very stiff; laminated.					on:	N/A			
Naterial Description National Description	Job No.: 32	20-10	Client: Ormat		1	Date:		12/2/10			
Depth Lith (Feet) ology Material Description Waterial Desc	Drill Method:	Hollow-Stem Auger	Driving Weight:	140 lbs / 30 in	I	ogged	By:	DLJ			
Depth (Feet) ology Material Description a Bows C B B Woisture C P o V C P O V Content C P O V C P O V Content C P O V P			CONTROL CONTRO		W	Sam	ples	Lal	boratory Tes	ts	
SILT (ML): dry, loose. 40 19.1 108.1		Ма	terial Description		a t e	Per	C B u 1 l e k	Content	Density	Other Lab Tests	
Clayer SILT (MH): dark gray, slightly moist, very stiff. 27 18.6 98.2 SILT with Sand (ML): gray, dry, very stiff; laminated. CLAY (CH): dark grayish brown, moist, very stiff; trace silt, some iron staining, plastic. 28 29 21 22 23 25.4 98.2 25.4 98.2 31 31 31 31 32 33 34 35 36 37 38 39 30 30 30 30 30 30 30 30 30											
SILT with Sand (ML): gray, dry, very stiff; laminated. 27 18.6 98.2	- 3 - 4							19.1	108.1	EI, Chen	
- 8	- 6	SILT with Sand (ML): gray	ed.	-	27		18.6	98.2			
- 11 Staining, plastic. 20 23.4 96.2	- 8										
- 13 - 14 - 15 - 16 - 17 - 18 - 19 - 20 - 21 - 22 - 23 - 24	-11 ///	CLAY (CH): dark grayish be staining, plastic.	rown, moist, very stiff;	trace silt, some iron		26		25.4	98.2		
- 16 - 17 - 18 - 19 - 20 -	- 13										
- 18 - 19 - 20 - Silty SAND (SM): dark yellowish brown, very moist, medium dense; fine, poorly graded. 22.6 97.6	- 16	Silty CALY (CL): dark brow	wnish gray, moist, very	stiff.	_	29		23.0	100.5		
20 — Sinty SAND (SM): dark yenowish brown, very moist, medium dense, fine, poorly graded. 22.6 97.6 23.	- 18	City CAND CO. D. J. J	ovidh brown	ot modium donor							
	- 20 —	fine, poorly graded.	owish brown, very mol	si, medium dense;		13		22.6	97.6		
- 24 CLAY (CH): dark grayish brown, moist, stiff; plastic.											
	- 24	CLAY (CH): dark grayish b	rown, moist, stiff; plas	tic.	_						
PLAT	- VIIIII								PL	ATE A	

Project: E	Brawley - Jimemz		T. HTT.	E	Boring	No.:	B-2		
Location: 1	op of Western Descendin	g Slope (South End	1)	E	Elevati	on:	N/A		
Job No.: 3	20-10	Client: Ormat		I	Date:		12/2/10 DLJ		
Orill Method	: Hollow-Stem Auger	Driving Weight:	140 lbs / 30 in	I	ogged	By:			
		ALL SOLD CONTRACTOR OF THE SOLD CONTRACTOR OF		W	Sam	ples	Lal	oratory Test	S
Depth Lith- (Feet) ology	Ма	terial Description		w a t e r	Blows Per Foot	C B o u l l e k	Moisture Content (%)	Dry Density (pcf)	Otho Lat Test
- 26 27 - 28 - 29 - 30 —	reddish brown.				13		29.1	92.7	
- 31	Total Depth 31.5 Feet No Groundwater Encounter Boring Backfilled with Cutt								
		SHOOSEN ALSO HANDON HE SHOW)	Ш				PI.A	TE A

	Southeast Corner of Site	T American			Elevati	011.	N/A				
Job No.: 3	320-10	Client: Ormat	Client: Ormat		Date:		12/2/10				
Drill Method	d: Hollow-Stem Auger	ow-Stem Auger Driving Weight: 140 lbs / 30 in		I	Logged	l By:	DLJ	DLJ			
				W	Sam			boratory Test	3		
Depth Lith- (Feet) ology		nterial Description		a t e r	Blows Per Foot	C B o u r 1 e k	Moisture Content (%)	Dry Density (pcf)	Oth Lai Tes		
- 1 - 2	LACUSTRINE DEPOSITE Silty CLAY (CL): dark brown				27		15.5	94.5			
- 3 - 4 - 5 — - 6	SILT with Sand (ML): light laminated.	gray, moist, very stiff;	trace clay,		26		20.3	99.4			
- 7 - 8 - 9 - 10 - 11 - 12	CLAY (CH): dark grayish b	orown, moist, stiff; lam	inated, plastic.		20		27.3	98.2			
- 13 - 14 - 15 — - 16 - 17	reddish gray, with iron stain	ing.			25		24.8	101.1			
- 18 - 19 - 20 —	Silty SAND (SM): grayish b graded.	prown, wet, medium de	nse; fine, poorly	-	19		23.9	96.3			
-1.64.1	Total Depth 21.5 Feet No Groundwater Encountere Boring Backfilled with Cutt										

Location	Autor Sales	ortheast Corner of Site			-	Elevati	755	N/A				
Job No.	: 32	20-10	Client: Ormat			Date: 12/2/10						
Drill Me	ethod:	hod: Hollow-Stem Auger Driving Weight: 140 lbs / 30 in					Logged By: DLJ					
				W Samples			Laboratory Tests					
	Lith- ology	Ma	nterial Description		a t e r	Blows Per Foot	C B o u r 1 e k	Moisture Content (%)	Dry Density (pcf)	Oth La Tes		
		TOPSOIL										
- 1		Silty CLAY (CL): dark gray LACUSTRINE DEPOSIT		oist, loose; tilled.	1					1 1		
- 2		Silty CLAY (CL): dark gray		oist, very stiff;		43		19.3	106.6	Е		
- 3		laminated.						15.0	100.0			
4							1319					
5 —		Silty CLAY (CH): dark gray	yish brown, slightly mo	oist, very stiff;		20		21.9	99.4			
6		laminated, plastic.										
7												
8												
9												
10		Silty SAND (SM): brown, s	lightly wet, loose; fine	, poorly graded.		11		28.1	96.1			
11							B -					
12		encountered grounwater bet	ween 12 to 13 feet		∇					.0		
13		cheountered grounwater bet	ween 12 to 13 leet.							2		
14												
15 —		medium dense, saturated.				15		26.4	95.9			
16												
17							H					
18												
19								5 300				
20 —		loose.				11		29.6	94.1	×		
21		CLAY (CH): dark grayish b	rown, moist.		-							
		Total Depth 21.5 Feet										
		Groundwater Encountered E Boring Backfilled with Cutt		t				114				
		9										

APPENDIX B

LABORATORY TEST DATA



APPENDIX B

LABORATORY TEST PROCEDURES

Soil Classification

Surficial soils encountered within the hand auger excavations were classified and described using the visual-manual procedures of the Unified Soil Classification System, and in general accordance with Test Method ASTM D 2488.

In-Situ Moisture and Density

Moisture content and unit dry density of in-place soil were determined in representative strata. Test data are summarized in the boring logs, Appendix A.

Expansion Potential

Expansion index tests were performed on selected samples of onsite soil in accordance with Test Method ASTM D4829. The expansion potential classification was determined on the basis of the expansion index value. The result of this test is presented on Plate B-1.

Chemical Analyses

Chemical analyses were performed on a selected sample of on-site soil to determine water-soluble sulfate and chloride content. These tests were performed in accordance with California Test Method Nos. 417 and 422, respectively. Test results are presented on Plate B-1.

Resistivity and pH

Resistivity and pH tests were performed on selected sample of on-site soil to provide a preliminary evaluation of its corrosive potential to concrete and metal construction materials. These tests were performed in accordance with California Test Method Nos. 532 and 643, respectively. The results of these tests are included in Plate B-1.



EXPANSION INDEX TEST DATA

Boring/Depth (feet)	Soil Type	Expansion ¹ Index	Expansion ² Potential
B-2 @ 0-5	Dark gray clayey SILT(MH)	72	Medium
B-4 @ 1-5	Dark grayish brown silty CLAY (CH)	102	High

CORROSIVITY TEST DATA

Boring/Depth (feet)	Sulfate ³ (%)	Chloride ⁴ (ppm)	pH ⁵	Resistivity ⁵ (ohm-cm)	Corrosivity Potential
B-2 @ 0-5	0.268	262	6.9	120	concrete: severe steel: severe

- (1) PER ASTM D4829
- (2) PER 2007 CBC Section 1802.3.2
- (3) PER CALIFORNIA TEST METHOD NO. 417
- (4) PER CALIFORNIA TEST METHOD NO. 422
- (5) PER CALIFORNIA TEST METHOD NO. 643
- (5) PER CALIFORNIA TEST METHOD NO. 643



May 12, 2021

Ms. Corinne Lytle Bonine, PMP Environmental Planner Chambers Group, Inc.

LLG Reference: 3-20-3302

Subject: Brawley Solar Project

Imperial County, California

Dear Ms. Bonine:

Linscott, Law & Greenspan, Engineers (LLG) has prepared this letter report to summarize the results of our evaluation of the proposed Brawley Solar Project ("Project") from a traffic and transportation perspective. The Project site is located at 5003 Best Ave, Brawley, California.

INTRODUCTION

The project is proposing to build, operate and maintain the Brawley Solar Energy Facility, a 40 Megawatt (MW) photovoltaic (PV) solar farm and 40 MW/160 MWh battery energy storage system (BESS) on approximately 225 acres in Brawley, Imperial County. The County of Imperial (County) has identified the Project as a Solar Energy Electrical Generator, which is a permitted use within the A-2-G zone upon approval of a Conditional Use Permit (CUP). The purpose of this letter report is to explain the construction traffic that will be generated by the project. Included in this traffic report are the following.

- Project Description
- Existing Conditions Discussion
- Trip Generation
- Summary and Conclusions

PROJECT DESCRIPTION

Project Location

The Project is located at 5003 Best Ave, Brawley, California on six privately owned parcels. Imperial County identifies the land use of the Project site as Agriculture and zoning as General Agricultural. Currently the Project site contains alfalfa fields within different levels of harvest. North and east of the Project site is undeveloped agricultural land. South of the Project site is a mixture of undeveloped agricultural

Engineers & Planners

Traffic Transportation Parking

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Richard E. Barretto, PE
Keil D. Maberry, PE
Walter B. Musial, PE
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land and dirt lots used for staging activities. The City of Brawley Wastewater Treatment Plant is located along the western edge of the Project site.

Figure 1 shows the Project Area Map.

Project Description

Solar cells, also called photovoltaic (PV) cells, convert sunlight directly into electricity. PV cells combine to create solar modules, or panels, and many solar panels combined together to create one system is called a solar (or PV) array. Installation of the PV arrays would include installation of mounting posts, module rail assemblies, PV modules, inverters, transformers and buried electrical conductors. Concrete would be required for the footings, foundations and pads for the transformers and substation work.

All access to the Project site would be located off Best Avenue. Access roads would be constructed with an all-weather surface, to meet the County Fire Department's standards, and lead to a locked gate that can be opened by any emergency responders. An all-weather surface access road, to meet the County's standards, would surround the perimeter of the Project site, as well as around solar blocks no greater than 500 by 500 feet. The Project would be required to conform to all California Public Utilities Commission (CPUC) safety standards. The Project site perimeter would be fenced with a 6-foot high chain link security fence topped with barbed wire, with gates at the access points.

Construction activities would be sequenced and conducted in a manner that addresses storm water management and soil conservation. During construction, electrical equipment would be placed in service at the completion of each power-block, after the gen-tie line has been completed. The activation of the power-blocks is turned over to interconnection following the installation of transformer and interconnection equipment upgrades. This in-service timing is critical because PV panels can produce power as soon as they are exposed to sunlight, and because the large number of blocks and the amount of time needed to commission each block requires commissioning to be integrated closely with construction on a block-by-block basis.

During construction the workforce would consist of laborers, electricians, supervisory personnel, support personnel and construction management personnel. Up to 120 people are expected to be on-site per day. Project laydown and construction staff parking is expected to be located on-site or at the North Brawley Geothermal Power Plan in an approximately 4-acre area.

Construction is anticipated to start in quarter four of 2021 and would take approximately 6-9 months to complete. Construction would generally occur during daylight hours, Monday through Friday. However, non- daylight work hours may be necessary to make up schedule deficiencies, or to complete critical construction activities. For example, during hot weather, it may be necessary to start work earlier to avoid pouring concrete during high ambient temperatures. If construction is to

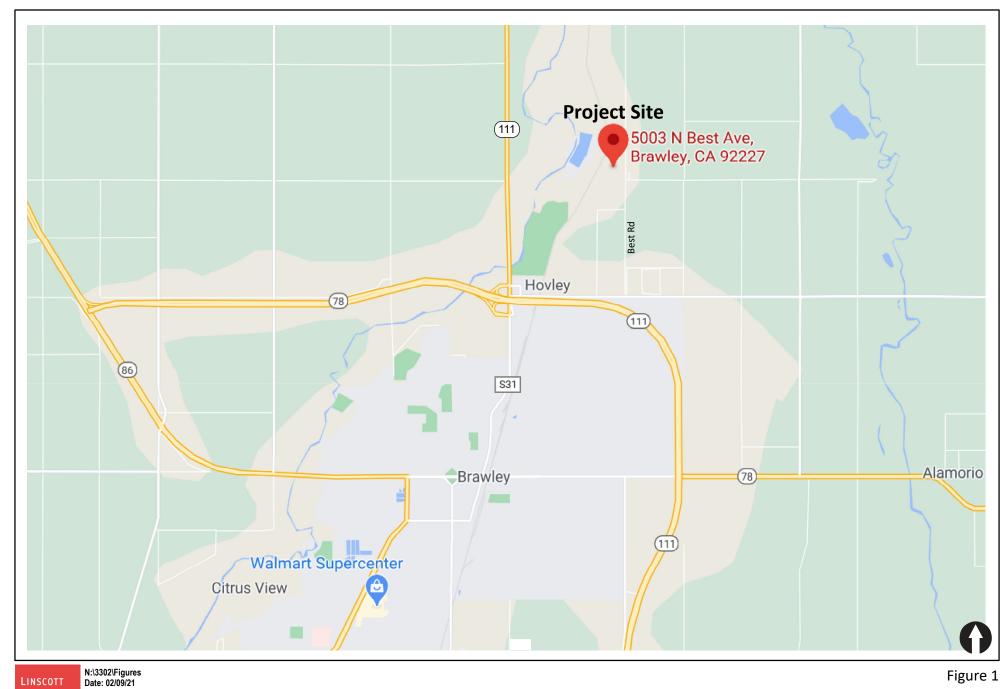
occur outside of the County's specified working hours, permission in writing will be sought at the time. The County's construction equipment operation shall be limited to the hours of 7 a.m. to 7 p.m., Monday through Friday, and 9 a.m. to 5 p.m. Saturday. No commercial construction operations are permitted on Sunday or holidays.

Construction of the Project would occur in phases beginning with site preparation and grading and ending with equipment setup and commencement of commercial operations. Overall, construction would consist of three major phases over a period of approximately 6-9 months:

- 1. Site Preparation, which includes clearing grubbing, grading, service roads, fences, drainage, and concrete pads; (1 month) (60 workers and 50 trucks).
- 2. PV system installation and testing, which includes installation of mounting posts, assembling the structural components, mounting the PV modules, wiring; (7 months) (100 workers and 60 trucks).
- 3. Site clean-up and restoration. (1 month) (40 workers and 40 trucks).

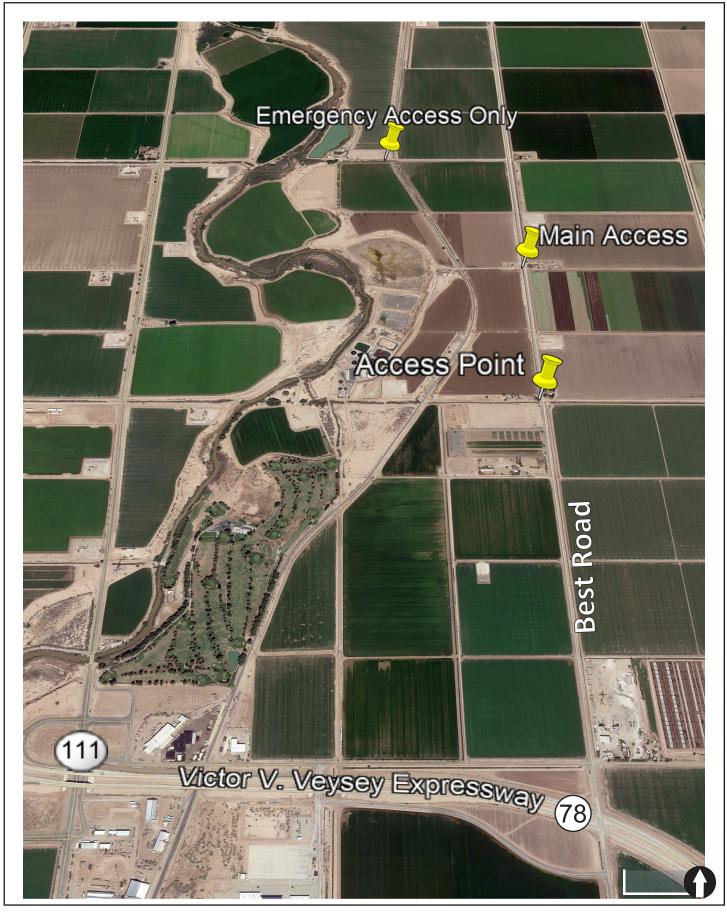
Once fully constructed, the Project would be operated on an unstaffed basis and be monitored remotely from the Brawley Geothermal Power Plant control room, with periodic on-site personnel visitations for security, maintenance and system monitoring.

Figure 2 shows the Construction Access Points



LAW & GREENSPAN engineers

Project Area Map



LINSCOTT Date: 05/12/21 LAW & GREENSPAN

engineers

Figure 2

Construction Access Points

EXISTING CONDITIONS

Existing Transportation Conditions

The following is a description of the nearby roadway network:

Best Avenue is an unclassified roadway in the Imperial County Circulation Element Plan. It is currently constructed as a two-lane north-south roadway in the study area. There is no posted speed limit. There are no bike lanes provided.

Ward Road is an unclassified roadway in the Imperial County Circulation Element Plan. It is currently constructed as a two-lane east-west roadway in the study area. There is no posted speed limit. There are no bike lanes provided.

State Route 111 (SR-111) begins at the International Border between Mexico and the United States traveling north with two travel lanes in each direction. SR 111 (Imperial Avenue) is classified as a 4-Lane primary north/south arterial in the City of Calexico Circulation Element. Class II bicycle lanes are provided north of SR 98. Bus stops are not provided. Curb, gutter, and sidewalks are provided south of SR 98. Curbside parking is permitted intermittently south of SR 98, on both sides of the roadway. The speed limit is posted at 55 mph.

TRIP GENERATION

Project Trip Generation

As described above, construction of the Project would occur in phases beginning with site preparation and grading and ending with equipment setup and commencement of commercial operations. During peak construction activities, 120 workers and a maximum of 60 trucks at a time would be required.

Daily and peak hour trip generation rates and in/out splits were calculated for the peak construction period using detailed data developed for analysis of the project's impacts. Construction activities would generally occur during a 12-hour-shift day. A worst case scenario in which all employees would arrive prior to the morning peak commuter period (7:00 – 9:00 a.m.) and depart within the evening peak period (4:00 – 6:00 p.m.) was assumed. Truck trips are anticipated to be distributed generally evenly throughout the 12-hour-shift day. In order to provide a conservative analysis, all employees were assumed to arrive and depart during peak commute periods. In addition, no carpooling for construction employees was assumed.

A passenger-car-equivalent (PCE) factor of 2.5 was applied to heavy vehicles (per the Highway Capacity Manual or HCM) to account for their reduced performance characteristics in the traffic stream (e.g. starting, stopping, and maneuvering). This information was used in calculating the project-generated average daily traffic (ADT).

Table 1
Construction Project Trip Generation

	Size	PCE ^b	Daily Trips		AM Peak Hour		PM Peak Hour	
Use			Rate	Volume	Volume		Volume	
			(In + Out)	(ADT) ^a	In	Out	In	Out
Personnel	120	1	2.0 /personnel	240	114	6	6	114
Trucks	60	2.5	2.0 /truck	300	13	13	13	13
Subtotal	-	-	-	540	127	19	19	127

Footnotes:

- a. ADT Average daily traffic
- b. PCE Passenger Car Equivalent

General Notes:

- 1. To estimate the employee traffic, it is conservatively assumed that 100% of the employee traffic would access the work area during the same commuter peak hours between 7:00-9:00 a.m. & 4:00-6:00 p.m..
- 2. The In/Out splits assumed are 95:5 during AM peak hour and 5:95 during the PM peak hour.
- 3. Truck trips are estimated to occur relatively evenly throughout a 12-hour construction hours proposed for the Project. For 30 trucks, this calculates to approximately 2.3 trucks/hour without PCE.
- 4. A passenger-car-equivalent (PCE) factor of 2.5 was applied to heavy vehicles (per the Highway Capacity Manual or HCM)

Table 1 tabulates the total daily and peak hour project traffic volumes. The project during construction trip generation is calculated to be 540 ADT with 127 inbound/19 outbound trips during the AM peak hour and 19 inbound/127 outbound trips during the PM peak hour. These values include the heavy-vehicle PCE-adjustment. Post-construction, the facility would be operated on an unstaffed basis and be monitored remotely from the Brawley Geothermal Power Plant control room, with periodic on-site personnel visitations for security, maintenance and system monitoring. Therefore, an assessment of the post-construction scenario was not conducted.

CONCLUSION

Based on the low amount of construction trips generated and low existing traffic volumes on area roadways, no substantial transportation impacts are anticipated.

Vehicle Miles Traveled (VMT) analysis is not required since the post construction operational traffic is close to zero.

Please call us at 858.300.8800 if you have any questions or comments regarding this letter report.

Sincerely,

Linscott, Law & Greenspan, Engineers

John Boarman, PE Principal

Water Supply Assessment

BRAWLEY SOLAR ENERGY FACILITY

ORNI 30. LLC

PREPARED BY: DUBOSE DESIGN GROUP

November 2021

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ACRONYMS

A-2 G Agricultural Zone – 2, Geothermal Overlay

AC Alternative Current

AF Acre-Foot or Acre-Feet

AFY Acre-Feet per Year

AOP Annual Operations Plan

APN Assessor's Parcel Number

BESS Battery Energy Storage System

CAP Central Arizona Project

CARB California Air Resources Board

CDCR California Department of Corrections and Rehabilitation

CDPH California Department of Public Health

CDWR California Department of Water Resources

CEQA California Environmental Quality Act

CPUC California Public Utility Commission

CRWDA Colorado River Water Delivery Agreement

CUP Conditional Use Permit

CVWD Coachella Valley Water District

CWC California Water Code

DC Direct Current

EDP IID Equitable Distribution Plan

EHS Environmental Health & Safety

EIS Environmental Impact Statement

G Land Zoning Geothermal

Gen-Tie Line Generation Tie Line

ICPDS Imperial County Planning and Development Services

ICS Intentionally Created Surplus

IEEE Institute of Electrical and Electronics Engineers

IID Imperial Irrigation District

IOPP Inadvertent Overrun Payback Policy

ISG Interim Surplus Guidelines

IRWMP Integrated Regional Water Management Plan

IVAPCD Imperial Valley Air Pollution Control District

IWSP Interim Water Supply Policy

KAF Thousand Acre Feet

KGRA Known Geothermal Resource Area

kV Kilovolt

kVA Kilovolt-amp

LAFCO Local Agency Formation Commission

LCR Lower Colorado Region

LCRWSP Lower Colorado Water Supply Project

M-2 Land Zoning Industrial-2

MCI Municipal, commercial, industrial

MEER Mechanical and Electrical Equipment Room

MGD Million Gallons per Day

MW Megawatt

MWh Megawatt per hour

MWD Metropolitan Water District of Southern California

NAF Naval Air Facility

ORNI ORNI 30, LLC (Applicant)

PCS Power Conversion Station

PV Photovoltaic

PE Land Zoning Pre-Existing

PVID Palo Verde Irrigation District

QSA Quantification Settlement Agreement and Related Agreements

RE Overlay Renewable Energy Overlay

SB Senate Bill

SCADA Supervisory Control and Data Acquisition

SDCWA San Diego County Water Authority

SNWA Southern Nevada Water Authority

SWRCB State Water Resource Control Board

TLCFP Temporary Land Conversion Fallowing Policy

USBR United States Bureau of Reclamation

USEPA United States Environmental Protection Agency

WSA Water Supply Assessment

PURPOSE OF WATER SUPPLY ASSESSMENT

This Water Supply Assessment (WSA) was prepared for the Imperial County Planning & Development Services (Lead Agency) by Dubose Design Group, regarding ORNI 30, LLC (ORNI) (the "Applicant") Brawley Solar Energy Facility ("Project"). This study is a requirement of California law, specifically Senate Bill 610 (referred to as SB 610). SB 610 is an act that amended Section 21151.9 of the Public Resources Code, and Sections 10631, 10656, 10910, 10911, 10912, and 10915 of the Water Code. SB 221 is an act that amended Section 11010 of the Business and Professions Code, while amending Section 65867.5 and adding Sections 66455.3 and 66473.7 to the Government Code. SB 610 was approved by the Governor and filed with the Secretary of State on October 9, 2001, and became effective January 1, 2002.¹ SB 610 requires a lead agency, to determine that a project (as defined in CWC Section 10912) subject to California Environmental Quality Act (CEQA), to identify any public water system that may supply water for the project and to request the applicants to prepare a specified water supply assessment.

This study has been prepared pursuant to the requirements of CWC Section 10910, as amended by SB 610 (Costa, Chapter 643, Stats. 2001). The purpose of SB 610 is to advance water supply planning efforts in the State of California; therefore, SB 610 requires the Lead Agency, to identify any public water system or water purveyor that may supply water for the project and to prepare the WSA after a consultation. Once the water supply system is identified and water usage is established for construction and operations for the life of the project, the lead agency is then able to coordinate with the local water supplier and make informed land use decisions to help provide California's cities, farms and rural communities with adequate water supplies.

Under SB 610, water supply assessments must be furnished to local governments for inclusion in any environmental documentation for certain projects (as defined in California Water Code (CWC) Section 10912 [a]) that are subject to the California Environmental Quality Act (CEQA). Due to

¹SB 610 amended Section 21151.9 of the California Public Resources Code, and amended Sections 10631, 10656, 10910, 10911, 10912, and 10915, repealed Section 10913, and added and amended Section 10657 of the Water Code. SB 610 was approved by California Governor Gray Davis and filed with the Secretary of State on October 9, 2001.

increased water demands statewide, this water bill seeks to improve the link between information on water availability and certain land use decisions made by cities and counties. This bill takes a significant step toward managing the demand placed on California's water supply. It provides further regulations and incentives to preserve and protect future water needs. Ultimately, this bill will coordinate local water supply and land use decisions to help provide California's cities, farms, rural communities, and industrial developments with adequate long-term water supplies. The WSA will allow the lead agency to determine whether water supplies will be sufficient to satisfy the demands of the project, in addition to existing and planned future uses.

PROJECT DETERMINATION ACCORDING TO SB 610 - WATER SUPPLY ASSESSMENT

With the introduction of SB 610, any project under the California Environmental Quality Act (CEQA) shall provide a Water Supply Assessment if the project meets the definition of CWC § 10912. Water Code section 10911(c) requires for that the lead agency "determine, based on the entire record, whether projected water supplies will be sufficient to satisfy the demands of the project, in addition to existing and planned future uses." Specifically, Water Code section 10910(c)(3) states that "If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water supply assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water years during a 20 year projection, will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses."

After review of CWC § 10912a, and Section 10912 (a)(5)(B), it was determined that the Applicant's Brawley Solar Energy Facility, a 40 Megawatt (MW) photovoltaic (PV) solar farm and 40 MW/160 Megawatt hour (MWh) battery energy storage system (BESS) on approximately 227 acres in Brawley, Imperial County (proposed Project), is deemed a project as it is considered an industrial

water use project that is considered an industrial plant of 40 acres or more in accordance to CWC § 10912a (5). The proposed project totals 227 acres which exceeds the 40 acre or less allowance. SB 610 requires an analysis to show that adequate water is available for the proposed Project in various climate scenarios for at minimum 20 years; however, Imperial County issues Conditional Use Permits.

EXECUTIVE SUMMARY

Imperial County Planning & Development Services (ICPDS) in coordination with Imperial Irrigation District (IID) has requested a WSA as part of the environmental review for the proposed Brawley Solar Energy Facility Project ("Project"). This study is intended for use by the ICPDS and IID in its evaluation of water supplies for existing and future land uses. The evaluation examines the following water elements:

- Water availability during a normal year
- Water availability during a single dry, and multiple dry water years
- Water availability during the Project's 30-year projection to meet existing demands
- Expected 30-year water demands of the Project
- Reasonably foreseeable planned future water demands to be served by the IID

The proposed Project site is located within IID's Imperial Unit and district boundary and as such is eligible to receive water service. IID has adopted an Interim Water Supply Policy (IWSP) for Non-Agricultural Projects, from which water supplies can be contracted to serve new developments within IID's water service area. For applications processed under the IWSP, applicants shall be required to pay a processing fee and, after IID board approval of the corresponding agreement, will be required to pay a reservation fee(s) and annual water supply development fees.

The IWSP sets aside 25,000 acre-feet annually (AFY) of IID's Colorado River water supply to serve new non- agricultural projects. As of October 2021, a balance of 23,800 AFY remain available under the IWSP for new non-agricultural projects ensuring reasonably sufficient supplies for such

projects. The proposed Project water demand for construction for a period of 1 year of approximately 32.5 AFY, represents approximately 0.03% of the annual unallocated supply set aside for new non-agricultural projects, and the total water demand for operations is approximately 3.1 AFY for 28 years and represents approximately 0.01% of the annual unallocated supply set aside for new non-agricultural projects. Decommissioning is expected to take 1 year and use approximately 32.5 AFY, representing approximately 0.03% of the annual unallocated supply set aside for new non-agricultural projects, the project is expected to consume 151.8 AF for the 30-year lifespan of the proposed Project. The annual average water demand of approximately 5.06 AFY represents .02% of the annual unallocated supply set aside for new non-agricultural projects. Thus, the proposed Project's estimated water demand would not affect IID's ability to provide water to other users in IID's water service area.

Table 1: Project APNs, Canals and Gates and Land Relationship to Project

IID Gate/ Canal	APN	Ownership	Zoning	Acres ²
Best Canal-Gate 110	037-140-006	ORNI 30,LLC	A2-G	32.75 AC
Best Canal-Gate 113	037-140-023	ORNI 30,LLC	A2-G	30.40 AC
Dest Carrar-Gate 113	037-140-022			30.30 AC
Best Canal-Gate 114	037-140-020	ORNI 30,LLC	A2-G	62.27 AC
Best carrai date 111	037-140-021			16.79 AC
Best Canal -Gate 115	037-140-020	ORNI 30,LLC	A2-G	

² The total acre amount and the project amount specified differ by 54.5 due to the fact that the project considers the linear acreage of the proposed Gen Tie Line.

Table 2: Project Water Use Summary

Water Use	Expected Years	Total AF
Construction ³	1 Year	32.5 AF
Total for Water Construction		32.5 AF
Processing, Daily Plant Operations & Mitigation ⁴	28 Years	3.1 AFY
Total Water Usage for Processing Daily Plant Operations & Mitigation		86.8 AF
Project Decommissioning	1 Year	32.5 AF
Total for Project Decommissioning		32.5AF
Total Water Usage for Project	30 Years	151.8 AF
Amortized	30 Years	5.06 AFY

Table 3: Amortized Project Water Summary

Project Water Use - Life of Project	Years	Total Combined ¹	IWSP (AFY)	% of Remaining Unallocated IWSP per Year ³
32.5 AFY	1 year	32.5 AF	23,800 AFY	0.03%-
3.1 AFY	28 Years	86.8 AF	23,800 AFY	0.01 %
32.5 AFY	1 Year	32.5 AF	23,800 AFY	0.03%-
5.06 AFY ²	30 Years	151.8 AF	23,800 AFY	0.02%

¹⁽AFY*Years)

PROJECT DESCRIPTION

ORNI 30, LLC (ORNI) is proposing to build, operate and maintain the Brawley Solar Energy Facility, a 40 Megawatt (MW) photovoltaic (PV) solar farm and 40 MW/160 Megawatt hour (MWh) battery energy storage system (BESS) on approximately 227 acres of private land in Brawley, in an unincorporated area of Imperial County (proposed Project) located at Best Avenue and Ward Road Please refer to Figure 1 for the Project's Regional Location (Figure 1 Site Regional Location), and Figure 2 for the Project Site and Vicinity (Figure 2 Aerial View of Project Site and Vicinity)

²(Total Combined/30 Years*100)

³(AFY/23,800 AFY*100)

³ 20, 000 gallons of water will need to be stored on site during construction per Imperial County Fire Standards.

⁴ 180,000 gallons of water will need to be stored on site per Imperial County Fire Standards for operations.

In general, the proposed Project can be described as follows: Power generated by the proposed Project would be low voltage direct current (DC) power that would be collected and routed to a series of inverters and their associated pad-mounted transformers. The inverters would convert the DC power generated by the panels to alternating current (AC) power and the pad mounted transformers would step up the voltage. The Project would connect to the North Brawley Geothermal Power Plant substation southwest of the proposed Project site via an approximately 1.8-mile-long aboveground 92 kilovolt (kV) generation tie line (gen-tie line). Energy generated and stored by the proposed Projectwill be sold to the wholesale market or retail electric providers in furtherance of the goals of the California Renewable Energy Portfolio Standards and other similar renewable programs in the Pacific Southwest power market. The Project plans to start constructon in the first quarter of 2022 and would take approximately 6-9 months, beginning operations by December 2022. Please refer to Figure 3 for the conceptual project layout and tentative site plan (Figure 3. Project Layout/Site Plan). The site will retain its domestic water delivery from a private vendor who will haul potable water to the project site.

The Brawley Solar Energy Facility involves two entitlement permits **from** Imperial County Planning Department including a General Plan Amendment and a Conditional Use Permit that will allow for the project to be in conformance with the Imperial County General Plan and Title 9 Division 5 Zoning Areas Established.

The Project will need to contract with IID to deliver up to 5.06 AFY see Table 2 of untreated water, via the Best Canal Gates 110, 114, 113, & 115. The proposed Project is anticipated to use approximately 151.8 AF for the duration of 30 Years, 3.1 AFY for operation of the Project for a duration of 28 years, which equals 86.8 AF of the Conditional Use Permits lifespan.

This WSA does not include an analysis of water supply for domestic potable water for, workers and visitors for domestic water, only that the project is expected to purchase potable water from a California certified vendor and have the water hauled to the site.

Project site and Location

The Project is located at 5003 Best Avenue, Brawley, California on five privately owned parcels: Assessor's Parcel Numbers (APNs) 037-140-020, 037-140-021, 037-140-022, 037-140-023, and 037-140-006 (Project site) as shown in Figure 1. The County of Imperial (County) identifies the land use of the proposed Project site as Agriculture and zoning as General Agricultural (A2-G; County 2020). Currently the Project site contains alfalfa fields within different levels of harvest. North and east of the Project site is undeveloped agricultural land. South of the Project site is a mixture of undeveloped agricultural land and dirt lots used for staging activities. The City of Brawley Wastewater Treatment Plant is located along the western edge of the Project site.

The County Land Use Ordinance, Division 17, includes the RE Overlay Zone, which authorizes the development and operation of renewable energy projects with an approved CUP. The RE Overlay Zone is concentrated in areas determined to be the most suitable for the development of renewable energy facilities while minimizing the impact on other established uses. CUP applications proposed for specific renewable energy projects not located in the RE Overlay Zone would not be allowed without an amendment to the RE Overlay Zone. The northern portion of the project site (APNs 037-140-020 and 037-140-021) is located within the RE Overlay Zone. However, the entire project site (APNs 037-140-020, 037-140-021, 037-140-022, 037-140-023, and 037-140-006) is located outside of the RE Overlay Zone. All parcels are within the Known Geothermal Resource Area. Therefore, the applicant is requesting a General Plan Amendment to include/classify all five project parcels into the RE Overlay Zone. No change in the underlying General Plan land use (Agriculture) is proposed.

Primary access to the Project site would be located off Best Avenue. The primary road will be using an existing access road while a new Improved access roads would be designed and constructed with an all-weather surface, to meet the County Fire Department's standards and Imperial Irrigations Districts standards due to the crossing of any canal, and lead to a locked gate that can be opened by any emergency responders. A secondary emergency access would be located to the

north of the Project site, just west of the train tracks. An all-weather surface access road, to meet the County's standards, would surround the perimeter of the Project site, as well as around solar blocks no greater than 500 by 500 feet. The proposed emergency access road is being proposed on Best Drain which will need to be designed and constructed to meet the County Fire Department's standards and Imperial Irrigations Districts standards. The Project would be required to conform to all California Public Utilities Commission (CPUC) safety standards. The Project site perimeter would be fenced with a 6-foot high chain link security fence topped with barbed wire, with gates at the access points. glass.

Gen-Tie Line

The Project would connect to a switchyard located in the southern end of the Project site and then routed through the BESS building for energy storage. Power would then be transferred to the North Brawley Geothermal Power Plant substation via a 1.6-mile-long double circuit 13.8 and 92 kV gen-tie line with 66-foot-high poles to interconnect to the Imperial Irrigation District (IID) at the North Brawley 1 substation located at Hovley Road and Andre Road, southwest of the Project site. The transmission line would span the New River. A 12-inch diameter conduit railroad undercrossing would connect the PV arrays from the western side of the railroad tracks to the inverters on the eastern side.

BESS

The Project's BESS component will be placed on in a 54,000 square-foot concrete pad at the southeastern corner of the Project site. The BESS will consist of 12 banks of enclosures totaling up to 432 enclosures. Each bank of batteries will be supported by a DC Combiner, control panel, and inverter/transformer skid. Each of the enclosures will utilize self-contained liquid cooling systems and include built-in fire suppression systems. All batteries will be lithium-ion based capable of storing 40 MW/160 MWh.

Fiberoptic Cable and Microwave Tower

A proposed fiberoptic line from the Project substation would be connected with the existing North Brawley substation approximately 1.6 miles to the southwest, which is required to connect the Project substation to the region's telecommunications system. Overall, this would provide Supervisory Control and Data Acquisition (SCADA), protective relaying, data transmission, and telephone services for the proposed Project substation and associated facilities. New telecommunications equipment would be installed at the Project substation within the unmanned Mechanical and Electrical Equipment Room (MEER). The proposed fiber optic telecommunications cable, once past the POI, would utilize existing transmission lines to connect to the North Brawley substation. The length of this proposed fiber optic telecommunications cable route would be approximately 1.6 miles. Alternatively, a microwave tower 40 to 100-feet tall could replace the need for a fiberoptic line to transmit data offsite. If selected, this microwave tower would be located within the Project substation footprint.

Substation

The proposed substation would be a new 92/12 kV unstaffed, automated, low-profile substation. The dimensions of the fenced substation would be approximately 300 feet by 175 feet, with the footprint encompassing approximately 1.2 acres of the approximately 227-acre Project parcel. The tallest feature of would be the dead-end portal structure (39 feet 6 inches) coming in off the gentie line, which would have a lighting mast attached, making it 54 feet 6 inches total. The onsite substation control room would house the SCADA, switchgear, breakers, and DC batteries. Additionally, a 20kV emergency backupgenerator would be located adjacent to this control room for the HVAC system. The proposed substationsite would be located at the southwest quarter of the parcel, adjacent to the BESS building. The California Building Code and the IEEE 693, Recommended Practices for Seismic Design of Substations, will be followed for the substation's design, structures, and equipment.

Construction Personnel and Equipment

The Project's construction workforce would consist of laborers, electricians, supervisory personnel, support personneland construction management personnel. Up to 120 people are expected to be on-site per day. Water for construction personnel will be purchased through a local vendor. Project laydown and construction staff parking is expected to be located on-site or at the North Brawley Geothermal Power Plan in an approximately 4-acre area.

Construction Schedule, Sequence and Phasing

Construction is anticipated to start in quarter four of 2021 and would take approximately 6-9 months to complete. Construction would commence only after all required permits and authorizations have been secured. Construction of the Project would occur in phases beginning with site preparation and grading and ending with equipment setup and commencement of commercial operations. Overall, construction would consist of three major phases over a period of approximately 6-9 months:

Site Preparation, which includes clearing grubbing, grading, service roads, fences, drainage, and concrete pads; (1 month) PV and BESS system installation and testing, which includes installation of mounting posts, assembling the structural components, mounting the PV modules, wiring; (7 months) and Site clean-up and restoration. (1 month)

Project Operation and Maintenance Activities

Once fully constructed, the Project would be operated on an unstaffed basis and be monitored remotely, with periodic on-site personnel visitations for security, maintenance, and system monitoring. Therefore, no full-time site personnel would be required on-site during operations and employees would only be on-site up to four times per year to wash the panels. As the Project's PV arrays and BESS components produce and manage electricity passively, maintenance requirements are anticipated to be very minimal. Any required planned maintenance activities would generally consist of equipment inspection and replacement and would be scheduled to

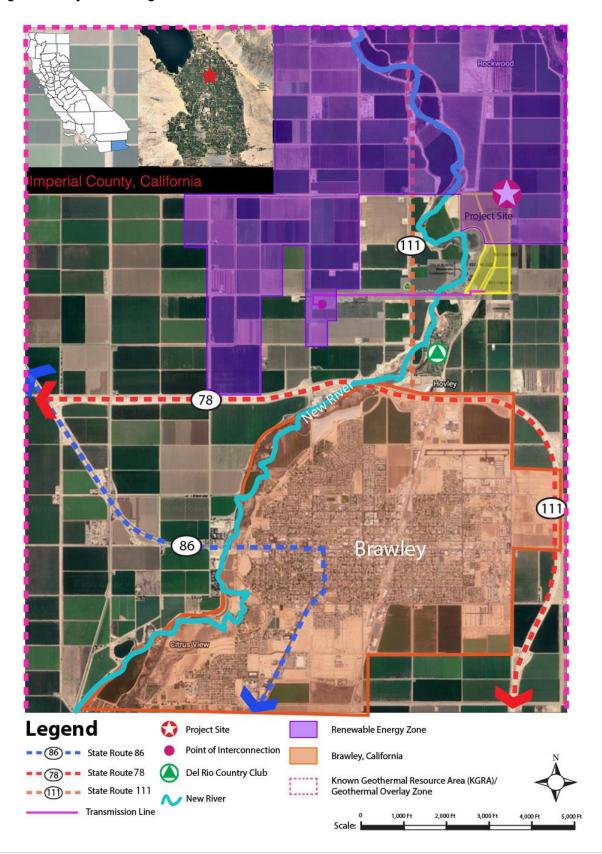
avoid peak load periods. Any unplanned maintenance would be responded to as needed, depending on the event.

Estimated annual water consumption for operation and maintenance of the proposed Project, including periodic PV module washing, would be approximately 3.1 acre feet annually (AFY), which would be trucked to the Project site as needed.

Project Decommissioning

Solar equipment has a lifespan of approximately 30 years. At the end of the Project's operation term, the applicant may determine that the Project should be decommissioned and deconstructed. Should the Project be decommissioned, concrete footings, foundations, and pads would be removed using heavy equipment and recycled at an off-site location. All remaining components would be removed for disposal and recycling (as applicable), and all disturbed areas would be reclaimed and recontoured. The total projected water use for decommissioning is expected to be 32.5 AF and its projected to take up to a year to decommission.

Figure 1: Project Site Regional Location



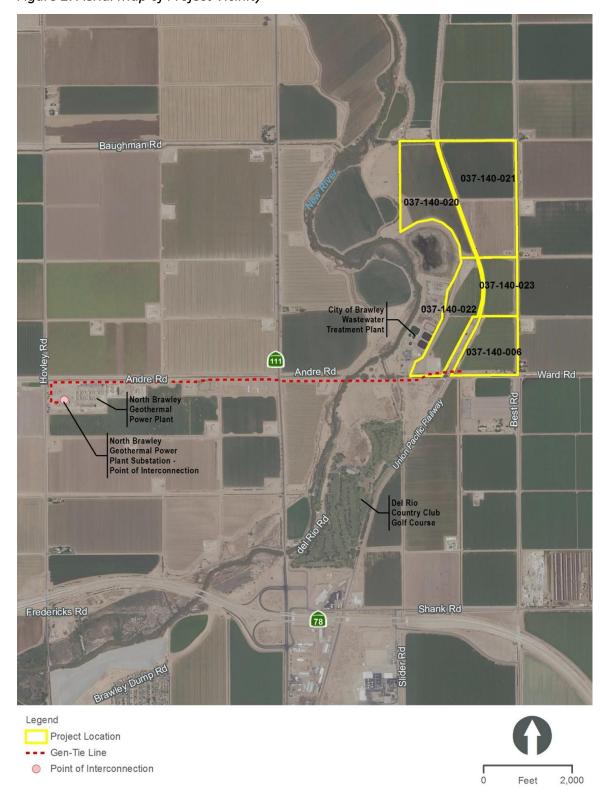


Figure 2: Aerial Map of Project Vicinity

Figure 3: Project Layout/Site Plan



Description of IID Service Area

The proposed Project site is located in Imperial County in the southeastern corner of California. The County is comprised of approximately 4,597 square miles or 2,942,080 acres.⁵ Imperial County is bordered by San Diego County to the west, Riverside County to the north, the Colorado River/Arizona boundary to the east, and 84 miles of International Boundary with the Republic of Mexico to the south. Approximately fifty percent of Imperial County is undeveloped land under federal ownership and jurisdiction. The Salton Sea accounts for approximately 11 percent of Imperial County's surface area. In 2020, sixteen percent (16%) of the area was in irrigated agriculture (466,952 acres), including 14,676 acres of the Yuma Project, some 35 sections or 6,227 acres served by Palo Verde Irrigation District (PVID), and 446,049 acres served by IID.⁶⁻⁷

The area served by IID is located in the Imperial Valley, which is generally contiguous with IID's Imperial Unit, lies south of the Salton Sea, north of the U.S./Mexico International Border, and generally in the 658,942 acre area between IID's Westside Main and East Highline Canals.⁸ In 2020, IID delivered untreated water to 494,921 net irrigated acres, predominantly in the Imperial Valley, along with small areas of East and West Mesa land, including non-agricultural areas.

The developed area consists of seven incorporated cities (Brawley, Calexico, Calipatria, El Centro, Holtville, Imperial and Westmorland), three unincorporated communities (Heber, Niland and Seeley), and three institutions (Naval Air Facility [NAF] El Centro, Calipatria CDCR, and Centinela CDCR) and supporting facilities. Figure 4 provides a map of the IID Imperial Unit boundary, as well as cities, communities and main canals.

⁵ Imperial County General Plan, Land Use Element 2008 Update

⁶ USBR website: <u>Yuma Project</u>. 7 June 2017, PVID website: <u>About Us</u>, Acreage Map. 7 June 2017.

⁷ Palo Verde Irrigation District Acreage Map http://www.pvid.org/pviddocs/acreage 2012.pdf > 7 June 2013

⁸ IID Annual Inventory of Areas Receiving Water Years 2017, 2016, 2015

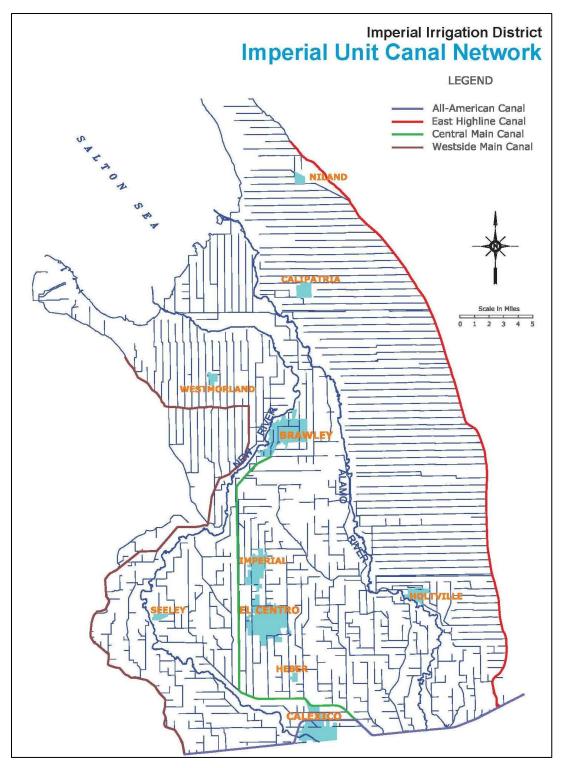


Figure 4 IID Imperial Unit Boundary and Canal Network

Climate Factors

Imperial Valley, located in the Northern Sonoran Desert, which has a subtropical desert climate is characterized by hot, dry summers and mild winters. Clear and sunny conditions typically prevail, and frost is rare. The region receives 85 to 90 percent of possible sunshine each year, the highest in the United States. Winter temperatures are mild rarely dropping below 32°F, but summer temperatures are very hot, with more than 100 days over 100°F each year. The remainder of the year has a relatively mild climate with temperatures averaging in the mid-70s.

The 100-year average climate characteristics are provided in Table 4. Rainfall contributes around 50,000 AF of effective agricultural water per inch of rain. Most rainfall occurs from November through March; however, summer storms can be significant in some years. Annual areawide rainfall is shown in Table 5. The thirty-year, 1991-2020, average annual air temperature was 73.7°F, and average annual rainfall was 2.70 inches, see Table 5 and Table 6. This record shows that while average annual rainfall has fluctuated, the 10-year average temperatures have slightly increased over the 30-year averages.

Table 4 Climate Characteristics, Imperial, CA 100-Year Record, 1921-2019

Climate Characteristic	Annual Value	
Average Precipitation (100-year record, 1921-2020)	2.79 inches (In)	
Minimum Temperature, Jan 1937	16 °F	
Maximum Temperature, July 1995	121 °F	
Average Minimum Temperature, 1921-2020	48.2 °F	
Average Maximum Temperature, 1921-2020	98.3 °F	
Average Temperature, 1921-2020	73.0 °F	

Source: IID Imperial Weather Station Record

Table 5: IID Areawide Annual Precipitation (In), (1991-2020)

1990	1991	1992	1993	1994	1995	1996
1.646	3.347	4.939	2.784	1.775	1.251	0.685
1997	1998	1999	2000	2001	2002	2003
1.328	2.604	1.399	0.612	0.516	0.266	2.402
2004	2005	2006	2007	2008	2009	2010
4.116	4.140	0.410	1.331	1.301	0.619	3.907
2011	2012	2013	2014	2015	2016	2017
2.261	2.752	2.772	1.103	2.000	1.867	2.183
2018	2019	2020				
1.305	3.017	2.673				

Source: Computation based on polygon average of CIMIS as station came online in the WIS.9

Notable from Table 5 (above) and Table 6 (below) is that while average annual rainfall measured at IID Headquarters in Imperial, CA, has been decreasing, monthly average temperatures are remarkably consistent.

Table 6: Monthly Mean Temperature (°F) – Imperial, CA 10-Year, 30-Year & 100-Year (2011-2020, 1991-2020, 1921-2020)

	Jan			Feb			Mar			Apr		
	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
10-year	82	32	57	84	35	60	93	42	67	100	47	73
30-year	81	34	57	84	37	60	92	41	66	99	47	71
100-year	80	31	55	86	34	60	91	40	64	99	46	71
		May			Jun			Jul			Aug	
	<u>Max</u>	<u>Min</u>	<u>Avg</u>	<u>Max</u>	<u>Min</u>	Avg	<u>Max</u>	<u>Min</u>	<u>Avg</u>	<u>Max</u>	<u>Min</u>	Avg
10-year	105	53	76	115	61	87	115	70	92	114	70	92
30-year	105	54	78	112	60	86	115	68	92	114	69	92
100-year	105	53	78	113	59	86	114	68	92	113	68	92
		Sep			Oct			Nov			Dec	
	<u>Max</u>	Min	Avg	<u>Max</u>	<u>Min</u>	Avg	<u>Max</u>	<u>Min</u>	Avg	<u>Max</u>	<u>Min</u>	Avg
10-year	111	62	87	101	52	76	91	39	64	80	32	55
30-year	110	62	87	102	50	76	90	39	64	79	32	55
100-year	110	60	86	101	49	75	89	38	63	80	32	56

 $^{^9}$ From 1/1/1990-3/23/2004, 3 CIMIS stations: Seeley, Calipatria/Mulberry, Meloland; 3/24/2004-7/5/2009, 4 CIMIS stations (added Westmorland N.); 7/6/2009-12/1/2009, 3 CIMIS stations: Westmorland N. offline; 12/2/2009-2/31/2009, 4 CIMIS stations, Westmorland N. back online; 1/1/2010-9/20/2010.

Table 7 Monthly Mean Rainfall (In) - Imperial, CA 10-Year, 30-Year & 100-Year (2011-2020, 1991-2020, 1921-2020)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
10-year	0.33	0.26	0.22	0.12	0.08	0.01	0.22	0.30	0.28	0.02	0.26	0.42	2.44
30-year	0.50	0.43	0.31	0.09	0.06	0.00	0.14	0.19	0.26	0.15	0.22	0.40	2.70
100-year	0.39	0.38	0.25	0.11	0.03	0.00	0.12	0.33	0.36	0.25	0.21	0.51	2.79

Source: IID WIS: CIMIS stations polygon calculation (Data provided by IID staff).

Imperial Valley depends on the Colorado River for its water, which IID transports, untreated, to delivery gates for agricultural, municipal, industrial (including geothermal and solar energy), environmental (managed marsh), recreational (lakes), and other non-agricultural uses. IID supplies the cities, communities, institutions, and Golden State Water (which includes all or portions Calipatria, Niland, and some adjacent Imperial County territory) with untreated water that they treat to meet state and federal drinking water guidelines before distribution to their customers. Industries outside the municipal areas treat the water to required standards of their industry. To comply with U.S. Environmental Protection Agency (USEPA) requirements and avoid termination of canal water service, residents in the IID water service area who do not receive treated water service must obtain alternative water service for drinking and cooking from a state-approved provider. To avoid penalties that could exceed \$25,000 a day, IID strictly enforces this rule. The IID Water Department tracks nearly 3,200 raw water service accounts required by the California Department of Public Health (CDPH) to have alternate state approved drinking water service. IID maintains a small-acreage pipe and drinking water database and provides an annual compliance update to CDPH.

IMPERIAL VALLEY HISTORIC AND FUTURE LAND AND WATER USES

Agricultural development in the Imperial Valley began at the turn of the twentieth century. In 2020, gross agricultural production for Imperial County was valued at \$2,026,427,000

, of which an estimated \$1,772,462,950 ¹owas produced in the IID water service area.¹¹ While the agriculture-based economy is expected to continue, land use is projected to change somewhat over the years as industrial and/or alternative energy development and urbanization occur in rural areas and in areas adjacent to existing urban centers, respectively.

Brawley Solar Energy Facility, would benefit the Imperial Valley by way of supporting the goals of diversification of a growing renewable energy economy and supplying the State of California with additional renewable energy.

Imperial Valley's economy is gradually diversifying. Agriculture will likely continue to be the primary industry within the valley; however, two principal factors anticipated to reduce crop acreage are renewable energy (geothermal and solar) and urban development. Over the next twenty years, urbanization is expected to slightly decrease agriculture land use to provide space for an increase in residential, commercial and industrial uses. The transition from agricultural land use typically results in a net decrease in water demand for municipal, commercial, and solar energy development; and a net increase in water demand for geothermal energy development Local energy resources include geothermal, wind, biomass and solar. The County General Plan provides for development of energy production centers or energy parks within Imperial County. Alternative energy facilities will help California meet its statutory and regulatory goals for increasing renewable power generation and use and decrease water demands in Imperial County.

The IID Board has adopted the following policies and programs to address how to accommodate water demands under the terms of the Quantification Settlement Agreement and Related

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http://www.co.imperial.ca.us/ag/docs/spc/crop reports/2017 Imperial County Crop and Live stock Report.pdf 2020 Imperial County Crop and Livestock Report

¹⁰ IID Service Area Acre (not including Palo Verde Irrigation District and Yuma Project) 446,049/ 2019 Imperial County Crop Report Total Harvested Acres of 527,860, Take Total Gross Value of \$2,026,427,000 multiplied by .85 and multiply by 100 which equates to 1,772,462,950 to get the approximate value.

Agreements (QSA)/ Transfers Agreements and minimize potential negative impacts on agricultural water uses:

Imperial Integrated Regional Water Management Plan: adopted by the board on December 18, 2012, and by the County, the City of Imperial, to meet the basic requirement of California Department of Water Resources (CDWR) for an IRWM plan. In all, 14 local agencies adopted the 2012 Imperial IRWMP.

<u>Interim Water Supply Policy for Non-Agricultural Projects:</u> adopted by the board on September 29, 2009, to ensure sufficient water will be available for new development, in particular, anticipated renewable energy projects until the board selects and implements capital development projects such as those considered in the Imperial IRWMP.

<u>Temporary Land Conversion Fallowing Policy:</u> adopted by the board on May 8, 2012, and revised on March 29, 2016, to provide a framework for a temporary, long-term fallowing program to work in concert with the IWSP and IID's coordinated land use/water supply strategy.

Equitable Distribution Plan: adopted by the board on October 28, 2013, to provide a mechanism for IID to administer apportionment of the district's quantified annual supply of Colorado River water; IID board approved a resolution repealing the Equitable Distribution Plan (EDP) on February 6, 2018. A revised EDP is anticipated to be adopted in 2022.

In addition, water users within the IID service area are subject to the statewide requirement of reasonable and beneficial use of water under the California Constitution, Article X, section 2.

IMPERIAL INTEGRATED REGIONAL WATER MANAGEMENT PLAN (OCTOBER 2012)

The Imperial Integrated Regional Water Management Plan (IRWMP) serves as the governing document for regional water planning to meet present and future water resource needs and demands by addressing such issues as additional water supply options, demand management and determination and prioritization of uses and classes of service provided. In November 2012, the Imperial County Board of Supervisors approved the Imperial IRWMP, and the City of Imperial City Council and the IID Board of Directors approved it in December 2012. Approval by these three (3) stakeholders meets the basic requirement of California Department of Water Resources (CDWR) for an IRWMP. Through the IRWMP process, IID presented to the region stakeholders options in the event long-term water supply augmentation is needed, such as water storage and banking, recycling of municipal wastewater, and desalination of brackish water. As discussed herein, long term water supply augmentation is not anticipated to be necessary to meet proposed Project demands.

Chapter 5 of the 2012 Imperial IRWMP addresses water supplies (Colorado River and groundwater), demand, baseline and forecasted through 2050; and IID water budget. Chapter 12 addresses projects, programs and policies, and funding alternatives. Chapter 12 of the IRMWP lists, and Appendix N details, a set of capital projects that IID might pursue, including the amount of water that might result (AFY) and cost (\$/AF) if necessary. These also highlight potential capital improvement projects that could be implemented in the future.

Imperial Valley historic 2015 and 2020 and the forecasted future for 2025 to 2055 non-agricultural water demand, are provided in Table 8 in five-year increments. Total water demand for non-agricultural uses is projected to be 201.4 KAF in the year 2055. This is a forecasted increase in the use of non-agricultural water from 107.4 KAF for the period of 2015 to 2055. These values were modified from Chapter 5 of the Imperial IRWMP to reflect updated conditions from the IID Provisional Water Balance for calendar year 2015 and 2020. Due to the recession in 2009 and

¹² October 2012 Imperial Integrated Regional Water Management Plan, Chapter 12.

¹³ Wistaria Solar Ranch, Final Environmental Impact Report, December 2014

other factors, non-agricultural growth projections have lessened since the 2012 Imperial IRWMP. Projections in Table 8 have been adjusted (reduced by 3%) to reflect IID 2015 and 2020 delivery data adjustments. Even with these adjustments, the Table 8 projections for non-agricultural water demand within the IID water service area continue to reflect an unlikely aggressive growth.

Table 8: Non-Agricultural Water Demand within IID Water Service Area, 2015-2055 (KAFY)

	2015	2020	2025	2030	2035	2040	2045	2050	2055
Municipal	30.0	30.9	36.8	39.8	41.5	46.3	51.7	57.8	61.9
Industrial	26.4	26.0	39.8	46.5	53.2	59.9	66.6	73.3	80.0
Other	5.5	6.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Feedlots/Dairies	17.8	19.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Envr Resources	8.3	9.2	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Recreation	7.4	9.5	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Service Pipes	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Total Non Ag	107.4	113.1	136.1	145.8	154.2	165.7	177.8	190.6	201.4

Notes: 2015 non-agricultural water demands are from IID 2015 Provisional Water Balance rerun 03/28/2019 2020-2055 demands are modified from 2012 Imperial IRWMP Chapter 5, Table 5-22 p 5-50 based on IID 2015 Provisional Water Balance. 2020 non-agricultural water demands are from IID2020 Provisional Water Balance rerun on 01/25/2021 2025-2055 demands are modified from 2012 Imperial IRWMP Chapter 5, Table 5-22 P5-50 based on IID 2020 Provisional Water Balance. Industrial Demand includes geothermal, but not solar, energy production.

Agricultural evapotranspiration (ET) demand of approximately 1,476.4 KAF in 2015, decreased in 2020 to around 1,442.2 KAF. The termination of fallowing programs provided 103.5 KAF of water for Salton Sea mitigation in 2017. Forecasted agricultural ET remains constant, as reductions in water use are to come from efficiency conservation not reduction in agricultural production. Market forces and other factors may impact forecasted future water demand.

Table 9 provides the 2015 and 2020 historic and 2025-2055 forecasted agricultural consumptive use and delivery demand within the IID water service area. When accounting for agriculture ET, tailwater and tilewater, total agricultural consumptive use (CU) demand ranges from 2,157.9 KAF in 2015 to 2,208.5 KAF in 2055. Forecasted total agricultural delivery demand is around 1 KAFY higher than the CU demand, ranging from 2,158.9 KAF in 2015 to 2,209.5 KAF in 2055.

Table 9: Historic and forecasted Agricultural Water Consumptive Use and Delivery Demand within IID Water Service Area, 2015-2055 (KAFY)

	2015	2020	2025	2030	2035	2040	2045	2050	2055
Ag ET from Delivered & Stored Soil Water	1,476.4	1,442.2	1,567.5	1,567.5	1,567.5	1,567.5	1,567.5	1,567.5	1,567.5
Ag Tailwater to Salton Sea	282.9	312.9	268.0	218.0	218.0	218.0	218.0	218.0	218.0
Ag Tilewater to Salton Sea	398.6	410.2	423.0	423.0	423.0	423.0	423.0	423.0	423.0
Total Ag CU Demand	2,157.9	2,165.4	2,258.5	2,208.5	2,208.5	2,208.5	2,208.5	2,208.5	2,208.5
Subsurface Flow to Salton Sea	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Total Ag Delivery Demand	2,158.9	2,166.4	2,259.5	2,209.5	2,209.5	2,209.5	2,209.5	2,209.5	2,209.5

Notes: 2015 record from IID 2015 Provisional Water Balance rerun 06/28/2019; 2020-2055 forecasts from spreadsheet used to develop Figure 19, et seq. in Imperial IRWMP Chapter 5 (Data provided by IID staff).

In addition to agricultural and non-agricultural water demands, system operational demands must be included to account for operational discharge, main and lateral canal seepage; and for All American Canal (AAC) seepage, river evaporation and phreatophyte ET from Imperial Dam to IID's measurement site at AAC Mesa Lateral 5. These system operation demands are shown in *Table 10*. IID measures system operational uses and at All-American Canal Station 2900 just upstream of Mesa Lateral 5 Heading. Total system operational use for 2020 was 167 KAF, including 10 KAF of LCWSP input, 39.8 KAF of seepage interception input, and 40 KAF of unaccounted canal water input.

Table 10 IID System Operations Consumptive Use within IID Water Service Area and from AAC at Mesa Lateral 5 to Imperial Dam, (KAF), 2020

Delivery System Evaporation	24.4
Canal Seepage	90.8
Canal Spill	10.1
Lateral Spill	121.5
Seepage Interception	-39.0
Unaccounted Canal Water	-40.0
Total System Operational Use, In valley	167.8
Imperial Dam to AAC @ Mesa Lat 5 (Dam-Mesa Lat 5)	9.2
LCWSP	-10
Total System Operational Use in 2020	167.0
Source: 2020 IID Water Balance rerun 01/25/2021	

IID INTERIM WATER SUPPLY POLICY FOR NON-AGRICULTURAL PROJECTS (SEPTEMBER 2009)

The IID IWSP provides a mechanism to address water supply requests for projects being developed within the IID service area. The IWSP designates up to 25,000 AFY of IID's annual Colorado River water supply for new non-agricultural projects, provides a mechanism and process to develop a water supply agreement for any appropriately permitted project, and establishes a framework and set of fees to ensure the supplies used to meet new demands do not adversely affect existing users by funding water conservation or augmentation projects as needed. ¹⁴

Depending on the nature, complexity and water demands of the proposed project, new projects may be charged a one-time Reservation Fee and an annual Water Supply Development Fee for the contracted water volume used solely to assist in funding new water supply projects. The applicability of the fee to certain projects will be determined by IID on a case-by-case basis, depending on the proportion of types of land uses and water demand proposed for a project. The 2021 fee schedule is shown in Table 11.

Table 11 Interim Water Supply Policy 2021 Annual Non-Agricultural Water Supply Development Fee Schedule

Annual Demand (AF)	Reservation Fee (\$/AF)*	Development Fee (\$/AF)*
0-500	\$75.40	\$301.59
501-1000	\$106.16	\$424.64
1001-2500	\$133.30	\$533.22
2501-5000	\$164.67	\$658.68

Adjusted annually in accordance with the Consumer Price Index (CPI).

IID customers with new projects receiving water under the IWSP will be charged the appropriate water rate based on measured deliveries, see <u>IID Water Rate Schedules</u>. As of September 2021, IID has issued one Water Supply Agreement for 1,200 AFY, leaving a balance of 23,800 AFY of supply available for contracting under the IWSP.

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¹⁴ IID website: <u>Municipal, Industrial and Commercial Customers</u>.

IID Temporary Land Conversion Fallowing Policy (May 2012)

Imperial County planning officials determined that renewable energy facilities were consistent with the county's agricultural zoning designation and began issuing CUPs for these projects with ten- to twenty-year terms. These longer-term, but temporary, land use designations were not conducive to a coordinated land use/water supply policy as envisioned in the Imperial IRWMP, because temporary water supply assignments during a conditional use permit (CUP) term were not sufficient to meet the water supply verification requirements for new project approvals. Agricultural landowners also sought long-term assurances from IID that, at project termination, irrigation service would be available for them to resume their farming operations.

Based on these conditions, IID determined it had to develop a water supply policy that conformed to the local land use decision-making in order to facilitate new development and economic diversity in Imperial County which has resulted in the IID Temporary Land Conversion Fallowing Policy (TLCFP).¹⁵ IID concluded that certain lower water use projects could still provide benefits to local water users. The resulting benefits; however, may not be to the same categories of use (e.g., MCI) but to the district as a whole.

At the general manager's direction, staff developed a framework for a fallowing program that could be used to supplement the IWSP and meet the multiple policy objectives envisioned for the coordinated land use/water supply strategy. Certain private projects that, if implemented, will temporarily remove land from agricultural production within the district's water service area include renewable solar energy and other non-agricultural projects. Such projects may need a short-term water supply for construction and decommissioning activities and longer-term water service for facility operation and maintenance or for treating to potable water standards. Conserved water will be credited to the extent that water use for the project is less than historic water use for the project site's footprint as determined by the ten year water use history. ¹⁶

¹⁵ IID website: <u>Temporary Land Conversion Fallowing Policy (TLCFP)</u>, and The <u>TLCFP</u> are the sources of the text for this section.

¹⁶ For details of how water conservation yield attributable to land removed from agricultural production and temporarily fallowed is computed, see <u>TLCFP for Water Conservation Yield</u>.

Water demands for certain non-agricultural projects are typically less than that required for agricultural production; this reduced demand allows water to be made available for other users under IID's annual consumptive use cap. This allows the district to avail itself of the ability during the term of the QSA/Transfer Agreements under CWC Section 1013 to create conserved water through projects such as temporary land fallowing conservation measures. This conserved water can then be used to satisfy the district's conserved water transfer obligation and for environmental mitigation purposes.

Under the terms of the legislation adopted to facilitate the QSA/Transfer Agreements and enacted in CWC Section 1013, the TLCFP was adopted by the IID board on May 8, 2012 and revised on March 29, 2016 to update the fee schedule for 2016. This policy provides a framework for a temporary, long-term fallowing program to work in concert with the IWSP. While conserved water generated from the TLCFP is limited by law for use for water transfer or environmental purposes, by satisfying multiple district objectives the TLCFP serves to reduce efficiency conservation and water use reduction demands on IID water users, thus providing district wide benefits.

IMPERIAL IRRIGATION DISTRICT'S WATER RIGHTS

The laws and regulations that influence IID's water supply are noted in this section. The Law of the River (as described below), along with the 2003 Quantification Settlement Agreement and Related Agreements serve as the laws, regulations and agreements that primarily influence the findings of this WSA. These agreements grant California the most senior water rights along the Colorado River and IID specify that IID has access to 3.1 MAF per year. These two components will influence future decisions in terms of water supply during periods of shortages.

CALIFORNIA LAW

IID's has a longstanding right to divert Colorado River water, and IID holds legal titles to all of its water and water rights in trust for landowners within the district (CWC §20529 and §22437; *Bryant v. Yellen*, 447 U.S. 352, 371 (1980), fn.23.). Beginning in 1885, a number of individuals, as well as the California Development Company, made a series of appropriations of Colorado River water under California law for use in the Imperial Valley. The rights to these appropriations were among the properties acquired by IID from the California Development Company.

LAW OF THE RIVER

Colorado River water rights are governed by numerous compacts, state and federal laws, court decisions and decrees, contracts, and regulatory guidelines collectively known as the "Law of the River." Together, these documents form the basis for allocation of the water, regulation of land use, and management of the Colorado River water supply among the seven basin states and Mexico.

Of all regulatory literature that governs Colorado River water rights, the following are the specifics that impact IID:

- Colorado River Compact (1922)
- Boulder Canyon Project Act (1928)
- California Seven-Party Agreement (1931)
- Arizona v. California US Supreme Court Decision (1964, 1979)
- Colorado River Basin Project Act (1968)
- Quantification Settlement Agreement and Related Agreements (2003)
- 2003 Colorado River Water Delivery Agreement: Federal QSA for purposes of Section 5(b) Interim Surplus Guidelines (CRWDA)
- 1970 Criteria for Coordinated Long-Range Operation of Colorado River Reservoirs
- Annual Operating Plan (AOP) for Colorado River Reservoirs
- 2007 Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lakes Powell and Mead (2007 Interim Guidelines)

COLORADO RIVER COMPACT (1922)

With authorization of their legislatures and urging of the federal government, representatives from the seven Colorado River basin states began negotiations regarding distribution of water from the Colorado River in 1921. In November 1922, an interstate agreement called the "Colorado River Compact" was signed by the representatives giving the Lower Basin perpetual rights to annual

apportionments of 7.5 million acre-feet (MAF) of Colorado River water (75 MAF over ten years). The Upper Basin was to receive the remainder, which based on the available hydrological record was also expected to be 7.5 MAF annually, with enough left over to provide 1.5 MAF annually to Mexico.

BOULDER CANYON PROJECT ACT (1928)

Provisions in the 1928 Boulder Canyon Project Act made the compact effective and authorized construction of Hoover Dam and the All-American Canal, and served as the United States' consent to accept the Compact. Through a Presidential Proclamation on June 25, 1929, this act resulted in ratification of the Compact by six of the basin states and required California to limit its annual consumptive use to 4.4 MAF of the lower basin's apportionment plus not less than half of any excess or surplus water unportioned by the Compact. A lawsuit was filed by the State of Arizona after its refusal to sign. Through the implementation of its 1929 Limitation Act, California abided by this federal mandate. The Boulder Canyon Act authorized the Secretary of the Interior (Secretary) to "contract for the storage of water... and for the delivery thereof... for irrigation and domestic uses," and additionally defined the lower basin's 7.5 MAF apportionment split, with an annual allocation 0.3 MAF to Nevada, 2.8 MAF to Arizona, and 4.4 MAF to California. Even though the three states never formally settled or agreed to these terms, a 1964 Supreme Court decision (*Arizona v. California*, 373 U.S. 546) declared the three states' consent to be insignificant since the Boulder Canyon Project Act was authorized by the Secretary.

CALIFORNIA SEVEN-PARTY-AGREEMENT (1931)

Following implementation of the Boulder Canyon Project Act, the Secretary requested that California make recommendations regarding distribution of its apportionment of Colorado River water. In August 1931, under chairmanship of the State Engineer, the California Seven-Party Agreement was developed and authorized by the affected parties to prioritize California water rights. The Secretary accepted this agreement and established these priorities through General Regulations issued in September of 1931. The first four (4) priority allocations account for California's annual apportionment of 4.4 MAF, with agricultural entities using 3.85 MAF of that

total. Additional priorities are defined for years in which the Secretary declares that excess waters are available.

ARIZONA V. CALIFORNIA U.S. SUPREME COURT DECISION (1964, 1979)

The 1964 Supreme Court decision settled a 25-year disagreement between Arizona and California that stemmed from Arizona's desire to build the Central Arizona Project to enable use of its full apportionment. California's argument was that as Arizona used water from the Gila River, which is a Colorado River tributary, it was using a portion of its annual Colorado River apportionment. An additional argument from California was that it had developed a historical use of some of Arizona's apportionment, which, under the doctrine of prior appropriation, precluded Arizona from developing the project. California's arguments were rejected by the U.S. Supreme Court. Under direction of the Supreme Court, the Secretary was restricted from delivering water outside of the framework of apportionments defined by law. Preparation of annual reports documenting consumptive use of water in the three lower basin states was also mandated by the Supreme Court. In 1979, present perfected water rights (PPRs) referred to in the Colorado River Compact and in the Boulder Canyon Project Act were addressed by the Supreme Court in the form of a Supplemental Decree.

In March of 2006, a Consolidated Decree was issued by the Supreme Court to provide a single reference to the conditions of the original 1964 decrees and several additional decrees in 1966, 1979, 1984 and 2000 that stemmed from the original ruling. The Consolidated Decree also reflects the settlements of the federal reserved water rights claim for the Fort Yuma Indian Reservation.

COLORADO RIVER BASIN PROJECT ACT (1968)

In 1968, various water development projects in both the upper and lower basins, including the Central Arizona Project (CAP) were authorized by Congress. Under the Colorado River Basin Project Act, priority was given to California's apportionment over (before) the CAP water supply in times of shortage. Also under the act, the Secretary was directed to prepare long-range criteria for the Colorado River reservoir system in consultation with the Colorado River Basin States.

QUANTIFICATION SETTLEMENT AGREEMENT AND RELATED AGREEMENTS (2003)

With completion of a large portion of the CAP infrastructure in 1994, creation of the Arizona Water Banking Authority in 1995, and the growth of Las Vegas in the 1990s, California encountered increasing pressure to live within its rights under the Law of the River. After years of negotiating among Colorado River Compact States and affected California water delivery agencies, a QSA and Related Agreements and documents were signed on October 10, 2003, by the Secretary of Interior, IID, Coachella Valley Water District (CVWD), Metropolitan Water District of Southern California (MWD), San Diego County Water Authority (SDCWA), and other affected parties.

The Quantification Settlement Agreement and Related Agreements (QSA/Transfer Agreements) are a set of interrelated contracts that resolve certain disputes among the United States, the State of California, IID, MWD, CVWD and SDCWA, for a period of 35 to 75 years, regarding the reasonable and beneficial use of Colorado River water; the ability to conserve, transfer and acquire conserved Colorado River water; the quantification and priority of Priorities 3(a) and 6(a)¹⁷ within California for use of Colorado River water; and the obligation to implement and fund environmental impact mitigation.

Conserved water transfer agreements between IID and SDCWA, IID and CVWD, and IID and MWD are all part of the QSA/Transfer Agreements. For IID, these contracts identify conserved water volumes and establish transfer schedules along with price and payment terms. As specified in the agreements, IID will transfer nearly 415,000 AF annually over a 35-year period (or loner), as follows:

- to MWD 110,000 AF [modified to 105,000 AF in 2007],
- to SDCWA 200,000 AF,
- to CVWD and MWD combined 103,000 AF, and
- to certain San Luis Rey Indian Tribes 11,500 AFY of water.

¹⁷ Priorities 1, 2, 3(b), 6(b), and 7 of current Section 5 Contracts for the delivery of Colorado River water in the State of California and Indian and miscellaneous Present Perfected Rights within the State of California and other existing surplus water contracts are not affected by the QSA Agreement.

All of the conserved water will ultimately come from IID system and on-farm efficiency conservation improvements. In the interim, IID has implemented a Fallowing Program to generate water associated with Salton Sea mitigation related to the impacts of the IID/SDCWA water transfer, as required by the State Water Resources Control Board, which ran from 2003 through 2017. In return for its QSA/Transfer Agreements programs and deliveries, IID will receive payments totaling billions of dollars to fund needed efficiency conservation measures and to pay growers for conserved on-farm water, so IID can transfer nearly 14.5 MAF of water without impacting local productivity. In addition, IID will transfer to SDCWA 67,700 AFY annually of water conserved from the lining of the AAC in exchange for payment of lining project costs and a grant to IID of certain rights to use the conserved water. In addition to the 105,000 acre-feet of water currently being conserved under the 1988 IID/MWD Conservation Program, these more recent agreements define an additional 303,000 AFY to be conserved by IID from on-farm and distribution system conservation projects for transferred to SDCWA, CVWD, and MWD.

COLORADO RIVER WATER DELIVERY AGREEMENT (2003).18

As part of QSA/Transfer Agreements among California and federal agencies, the Colorado River Water Delivery Agreement (CRWDA): Federal QSA for purposes of Section 5(b) Interim Surplus Guidelines was entered into by the Secretary of the Interior, IID, CVWD, MWD and SDCWA. This agreement involves the federal government because of the change in place of diversion from Imperial Dam into the All-American Canal to Parker Dam into MWD's Colorado River Aqueduct. The CRWDA assists California to meet its "4.4 Plan" goals by quantifying deliveries for a specific number of years for certain Colorado River entitlements so transfers may occur. In particular, for the term of the CRWDA, quantification of Priority 3(a) was affected through caps on water deliveries to IID (consumptive use of 3.1 MAF per year) and CVWD (consumptive use of 330 KAF per year). In addition, California's Priority 3(a) apportionment between IID and CVWD, with provisions for transfer of supplies involving IID, CVWD, MWD and SDCWA are quantified in the CRWDA for a period of 35 years or 45 years (assumes SDCWA does not terminate in year 35) or 75 years (assumes SDCWA and IID mutually consent to renewal term of 30 years).

¹⁸ CRWDA: Federal QSA accessed 7 June 2017.

Allocations for consumptive use of Colorado River water by IID, CVWD and MWD that will enable California to stay within its basic annual apportionment (4.4 MAF plus not less than half of any declared surplus) are defined by the terms of the QSA/Transfer Agreements (**Table 12**). As specified in the QSA/Transfer Agreements, by 2026, IID annual use within (Imperial Valley) is to be reduced to just over 2.6 MAF of its 3.1 MAF quantified annual apportionment. The remaining nearly 500,000 AF (which includes the 67,000 AF from AAC lining) are to be transferred annually to urban water users outside of the Imperial Valley.

Table 12 CRWDA Annual 4.4 MAF Apportionment (Priorities 1 to 4) for California Agencies (AFY)

User	Apportionment (AFY)
Palo Verde Irrigation District and Yuma Project*	420,000
Imperial Irrigation District	3,100,000
Coachella Valley Water District	330,000
Metropolitan Water District of Southern California*	550,000
Total:	4,400,000

^{*} PVID and Yuma Project did not agree to a cap; value represents a contractual obligation by MWD to assume responsibility for any overages or be credited with any volume below this value.

Quantification of Priority 6(a) was effected through quantifying annual consumptive use amounts to be made available in order of priority to MWD (38 KAF), IID (63 KAF), and CVWD (119 KAF) with the provision that any additional water available to Priority 6(a) be delivered under IID's and CVWD's existing water delivery contract with the Secretary.¹⁹ The CRWDA provides that the underlying water delivery contract with the Secretary remain in full force and effect (*Colorado River Documents 2008*, Chapter 6, pages 6-12 and 6-13). The CRWDA also provides a source of water to effect a San Luis Rey Indian Water rights settlement. Additionally, the CRWDA satisfies the requirement of the 2001 Interim Surplus Guidelines (ISG) that a QSA be adopted as a prerequisite to the interim surplus determination by the Secretary in the ISG.

INADVERTENT OVERRUN PAYBACK POLICY (2003)

The CRWDA Inadvertent Overrun Payback Policy (IOPP), adopted by the Secretary contemporaneously with the execution of the CRWDA, provides additional flexibility to Colorado

Notes: All values are consumptive use at point of Colorado River diversion: Palo Verde Diversion Dam (PVID), Imperial Dam (IID and CVWD), and Parker Dam (MWD). Source: IID Annual Water Report

¹⁹ When water levels in the Colorado River reservoirs are low, Priority 5, 6 and 7 apportionments are not available for diversion.

River management and applies to entitlement holders in the Lower Division States (Arizona, California and Nevada).²⁰ The IOPP defines inadvertent overruns as "Colorado River water diverted, pumped, or received by an entitlement holder of the Lower Division States that is in excess of the water users' entitlement for the year." An entitlement holder is allowed a maximum overrun of 10 percent (10%) of its Colorado River water entitlement.

In the event of an overrun, the IOPP provides a mechanism to payback the overrun. When the Secretary has declared a normal year for Colorado River diversions, a contractor has from one to three years to pay back its obligation, with a minimum annual payback equal to 20 percent of the entitlement holder's maximum allowable cumulative overrun account or 33.3 percent of the total account balance, whichever is greater. However, when Lake Mead is below 1125 feet on January 1, the terms of the IOPP require that the payment of the inadvertent overrun obligation be made in the calendar year after the overrun is reported in the USBR Lower Colorado Region Colorado River Accounting and Water Use Report [for] Arizona, California, and Nevada (Decree Accounting Report). ²¹

1970 CRITERIA FOR COORDINATED LONG-RANGE OPERATION OF COLORADO RIVER RESERVOIRS

The 1970 Operating Criteria control operation of the Colorado River reservoirs in compliance with requirements set forth in the Colorado River Compact of 1922, the United States-Mexico Water Treaty of 1944, the Colorado River Storage Project Act of 1956, the Boulder Canyon Projects Act (Lake Mead) and the Colorado River Basin Project Act (Upper Basin Reservoirs) of 1968, and other applicable federal laws. Under these Operating Criteria, the Secretary makes annual determinations published in the USBR Annual Operating Plan for Colorado River Reservoirs (discussed below) regarding the release of Colorado River water for deliveries to the lower basin states. A requirement to equalize active storage between Lake Powell and Lake Mead when there

²⁰ USBR, 2003 CRWDA ROD Implementation Agreement, IOPP and Related Federal Actions Final EIS. Section IX. Implementing the Decision A. Inadvertent Overrun and Payback Policy. Pages 16-19 of 34.

²¹ 2003 <u>CRWDA ROD</u>. Section IX. A.6.c,, page 18 of 34.

is sufficient storage in the Upper Basin is included in these operating criteria. **Figure 5** identifies the major storage facilities at the upper and lower basin boundaries.

ANNUAL OPERATING PLAN FOR COLORADO RIVER RESERVOIRS (Applicable Only if Lake Mead has Surplus/Shortage)

The AOP is developed in accordance with Section 602 of the Colorado River Basin Project Act (Public Law 90-537); the Criteria for Coordinated Long-Range Operations of Colorado River Reservoirs Pursuant to the Colorado River Basin Project Act of 1968, as amended, promulgated by the Secretary of the Interior; and Section 1804(c)(3) of the Grand Canyon Protection Act (Public Law 102-575). As part of the AOP process, the Secretary makes determinations regarding the availability of Colorado River water for deliveries to the lower basin states, including whether normal, surplus, and shortage conditions are in effect on the lower portion of the Colorado River.

2007 COLORADO RIVER INTERIM GUIDELINES FOR LOWER BASIN SHORTAGES (2007 INTERIM GUIDELINES)

A multi-year drought in the Colorado River Upper Basin triggered the need for the 2007 Interim Shortage Guidelines. In the summer of 1999, Lake Powell was essentially full with reservoir storage at 97 percent of capacity. However, precipitation fell off starting in October 1999 and 2002 inflow was the lowest recorded since Lake Powell began filling in 1963.²²,²³ By August 2011, inflow was 279 percent (279%) of average; however, drought resumed in 2012 and continued through calendar year 2020. Using the record in **Table 13**, average unregulated inflow to Lake Powell for water years 2000-2020 is 0.733 percent (73%); or if 2011 is excluded, 0.7015 percent (70%) of the historic average, see Table 13.

Table 13: Unregulated Inflow to Lake Powell, Percent of Historic Average, 2000-2020

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
62%	59%	25%	51%	49%	105%	73%	68%	102%	88%	73%
2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
136%	35%	49%	90%	83%	80%	101%	36%	120%	54%	

Source UCR Water Operations: Historic Data (2000-2020)

²² Water Year: October 1 through September 30 of following year, so water year ending September 30, 1999

²³ Drought in the Upper Colorado River Basin. August 2011

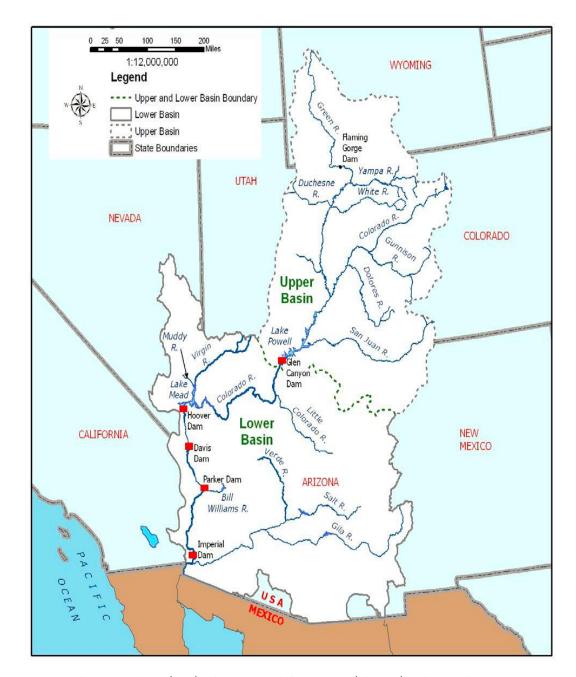


Figure 5 Major Colorado River Reservoir Storage Facilities and Basin Location Map

Source: Final EIS – Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead, Volume 1 Chapter 1 Purpose and Need, p I-10.

In the midst of the drought period, USBR developed 2007 Interim Guidelines with consensus from the seven basin states, which selected the Draft EIS Preferred Alternative as the basis for USBR's final determination. The basin states found the Preferred Alternative best met all aspects of the purpose and need for the federal action.²⁴

The 2007 interim Guidelines Preferred Alternative highlights the following:

- 1. The need for the Interim Guidelines to remain in place for an extended period of time.
- 2. The desirability of the Preferred Alternative based on the facilitated consensus recommendation from the basin states.
- 3. The likely durability of the mechanisms adopted in the Preferred Alternative in light of the extraordinary efforts that the basin states and water users have undertaken to develop implementing agreements that will facilitate the water management tools (shortage sharing, forbearance, and conservation efforts) identified in the Preferred Alternative
- 4. That the range of elements in the Preferred Alternative will enhance the Secretary's ability to manage the Colorado River reservoirs in a manner that recognizes the inherent tradeoffs between water delivery and water storage.

In June 2007, USBR announced that a preferred alternative for Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations of Lake Powell and Lake Mead (Final Preferred Alternative) had been determined. The Final Preferred Alternative, based on the basin states' consensus alternative and an alternative submitted by the environmental interests called "Conservation Before Shortage," is comprised of four key operational elements which are to guide operations of Lake Powell and Lake Mead through 2026 are:

1. Shortage strategy for Lake Mead and Lower Division states: The Preferred Alternative proposed discrete levels of shortage volumes associated with Lake Mead elevations to conserve reservoir storage and provide water users and managers in the Lower Basin with

²⁴ USBR Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead http://www.usbr.gov/lc/region/programs/strategies.html

- greater certainty to know when, and by how much, water deliveries will be reduced during low reservoir conditions.
- 2. Coordinated operations of Lake Powell and Lake Mead: The Preferred Alternative proposed a fully coordinated operation of the reservoirs to minimize shortages in the Lower Basin and to avoid risk of curtailments of water use in the Upper Basin.
- 3. Mechanism for storage and delivery of conserved water in Lake Mead: The Preferred Alternative proposed the Intentionally Created Surplus (ICS) mechanism to provide for the creation, accounting, and delivery of conserved system and non-system water thereby promoting water conservation in the Lower Basin. Credits for Colorado River or non-Colorado River water that has been conserved by users in the Lower Basin creating an ICS would be made available for release from Lake Mead at a later time. The total amount of credits would be 2.1 MAF, but this amount could be increased up to 4.2 MAF in future years.
- 4. Modifying and extending elements of the Interim Surplus Guidelines (ISG). The ISG determines conditions under which surplus water is made available for use within the Lower Division states. These modifications eliminate the most liberal surplus conditions thereby leaving more water in storage to reduce the severity of future shortages.

With respect to the various interests, positions and views of the seven basin states, this provision adds an important element to the evolution of the legal framework for prudent management of the Colorado River. Furthermore, the coordinated operation element allows for adjustment of Lake Powell releases to respond to low reservoir storage conditions in either Lake Powell or Lake Mead.²⁵ States found the Preferred Alternative best met all aspects of the purpose and need for the federal action.²⁶ The 2007 Interim Guidelines are in place from 2008 through December 31, 2025 (through preparation of the 2026 Annual Operating Plan).

²⁵ For a discussion of the 2007 Interim Guidelines, see: <u>Intermountain West Climate Summary</u> by TheWestern Water Assessment, issued Jan. 21, 2008, Vol. 5, Issue 1, January 2009 Climate Summary, Feature Article, pages 5-7, 22 Mar 2013.

 $^{{\}color{red}^{26}} \, \underline{\textit{USBR Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead.}$

LOWER COLORADO REGION WATER SHORTAGE OPERATIONS

The drought in the Colorado River watershed has continued through 2021 despite an increase in observed runoff in August 2011 when unregulated inflow to Lake Powell was 279 percent of the average. Since 2000, Lake Mead has been below the "average" level of lake elevations (see **Figure 6**). Such conditions have caused the preparation of shortage plans for waters users in Arizona and Nevada, and in Mexico.



Figure 6: Lake Mead Water Elevation Levels 2020 visit<http://www.arachnoid.com/NaturalResources/index.html>

According to guidelines put in place in 2007, Arizona and Nevada begin to take shortages when the water elevation in Lake Mead falls below 1,075 feet. The volumes of shortages increase as water levels fall to 1,050 feet and again at 1,025 feet. In 2012, Mexico agreed to participate in a 5-year pilot agreement to share specific volumes of shortages at the same elevations. The 2007 interim shortage guidelines contain no reductions for California, which has senior water rights to the Central Arizona Project water supply, through 2025 when the guidelines expire. If Lake Mead's elevation drops to 1,025 feet, a re-consultation process would be triggered among the basin states

to address next steps. Consultation would start out within each state, then move to the three lower basin states, followed by all seven states and the USBR. Mexico will then be brought into the process unless they choose to participate earlier.

IMPERIAL IRRIGATION DISTRICT WATER SUPPLY AND DEMAND

SB 610 requires an analysis of a normal, single dry, and multiple dry water years to show that adequate water is available for the proposed Project in various climate scenarios for at minimum 20 years. Water availability for this Project in a normal year is no different from water availability during a single-dry and multiple-dry year scenarios. This is due to the small effect rainfall has on water availability in IID's arid environment along with IID's strong entitlements to the Colorado River water supply. Local rainfall does have some impact on how much water is consumed (i.e., if rain falls on agricultural lands, those lands will not demand as much irrigation), but does not impact the definition of a normal year, a single-dry year or a multiple-dry year scenario.

WATER AVAILABILITY – NORMAL YEAR

IID is entitled to annual net consumptive use of 3.1 MAF of Colorado River, less its QSA/Transfer Agreement obligations. Imperial Dam, located north of Yuma, Arizona, serves as a diversion structure for water deliveries throughout southeastern California, Arizona and Mexico. Water is transported to the IID water service area through the AAC for use throughout the Imperial Valley. IID historic and forecast net consumptive use volumes at Imperial Dam from CRWDA Exhibit B are shown in Table 14. Volumes for 2003-2020 are adjusted for USBR Decree Accounting historic records. Volumes for 2021-2077 are from CRWDA Exhibit B modified to reflect 2014 Letter Agreement changes to the 1988 IID/MWD Water Conservation Agreement.²⁷

²⁷ <u>2014 Imperial Irrigation District Letter Agreement</u> for Substitution and Conservation Modifications to the IID/MWD Water Conservation Agreement - December 17, 2014.

Table 14 IID Historic and Forecast Net Consumptive Use for Normal Year, Single-Dry Year and Multiple-Dry Year Water Supply, 2003-2037, et seq. (CRWDA Exhibit B)

Col 1	2	3	4	5	6	7	8	9	10	11	
				IID Pr	iority 3(a)						
		IID Reductions									
Year	IID 3(a) Quantified Amount	1988 MWD Transfer ²	SDCWA Transfer	AAC Lining	Salton Sea Mitigation SDCWA Transfer ³	Intra- Priority 3 CVWD Transfer	MWD Transfer w\ Salton Sea Restoration 4	Misc. PPRs	IID Total Reduction (Σ Cols 3-9) ⁵	IID Net [Available for] Consumptive Use (Col 2 - 10)	
2003	3,100	105.1	10.0	0.0	0.0	0.0	0.0	11.5	126.6	2978.2	
2004	3,100	101.9	20.0	0.0	15.0	0.0	0.0	11.5	148.4	2743.9	
2005	3,100	101.9	30.0	0.0	15.0	0.0	0.0	11.5	158.4	2756.8	
2006	3,100	101.2	40.0	0.0	20.0	0.0	0.0	11.5	172.7	2909.7	
2007	3,100	105.0	50.0	0.0	25.0	0.0	0.0	11.5	191.5	2872.8	
2008	3,100	105.0	50.0	8.9	26.0	4.0	0.0	11.5	205.4	2825.1	
2009	3,100	105.0	60.0	65.5	30.1	8.0	0.0	11.5	280.1	2566.7	
2010	3,100	105.0	70.0	67.7	33.8	12.0	0.0	11.5	294.8	2540.5	
2011	3,100	103.9	63.3	67.7	0.0	16.0	0.0	11.5	262.4	2915.8	
2012	3,100	104.1	106.7	67.7	15.2	21.0	0.0	11.5	326.2	2,903.2	
2013	3,100	105.0	100.0	67.7	71.4	26.0	0.0	11.5	381.6	2,554.9	
2014	3,100	104.1	100.0	67.7	89.2	31.0	0.0	11.5	403.5	2,533.4	
2015	3,100	107.82	100.0	67.7	153.3	36.0	0.0	11.5	476.3	2,480.9	
2016	3,100	105.0	100.0	67.7	130.8	41.0	0.0	11.5	456.0	2,504.3	
2017	3,100	105.0	100.0	67.7	105.3	45.0	0.0	9.9	432.9	2,667.1.	
2018	3,100	105	130	67.7	0.1	63	0.0	9.7	375.5	2,724.5	
2019	3,100	105	160	67.7	46.55	68	0.0	6.9	454.2	2,645.8	
2020	3,100	105	192.5	67.7	0.0	73	0.0	9.8	448.0	2,652.0	
2021	3,100	105	205	67.7	0	78	0.0	11.5	467.2	2,632.8	
2022	3,100	105	203	67.7	0	83	0.0	11.5	470.2	2,629.8	
2023	3,100	105	200	67.7	0	88	0.0	11.5	472.2	2,627.8	
2024	3,100	105	200	67.7	0	93	0.0	11.5	477.2	2,622.8	
2025	3,100	105	200	67.7	0	98	0.0	11.5	482.2	2,617.8	
2026	3,100	105	200	67.7	0	103	0.0	11.5	487.2	2,612.8	
2027	3,100	105	200	67.7	0	103	0.0	11.5	487.2	2,612.8	
2028	3,100	105	200	67.7	0	103	0.0	11.5	487.2	2,612.8	
2029-37	3,100	105	200	67.7	0	103	0.0	11.5	487.2	2,612.8	
2038-47 ⁶	3,100	105	200	67.7	0	103	0.0	11.5	487.2	2,612.8	
2048-77 ⁷	3,100	105	200	67.7	0	50 ⁸	0.0	11.5	434.2	2,665.8	

- 1. 2003 through 2020, volumes are adjusted for actual USBR Decree Accounting values; IID Total Reduction and Net Available for Consumptive Use may not equal Col 2 minus Col 10, if IID conservation/use was not included in Exhibit B.
- 2. 2014 Letter of Agreement provides that, effective January 2016 total amount of conserved water available is 105 KAFY
- 3. Salton Sea Mitigation volumes may vary based on conservation volumes and method of conservation.
- 4. This transfer is not likely given lack of progress on Salton Sea restoration as of 2018; shaded entries represents volumes that may vary...
- 5. Reductions include conservation for 1988 IID/MWD Transfer, IID/SDCWA Transfer, AAC Lining; SDCWA Transfer Mitigation, MWD Transfer w/Salton Sea Restoration (if any); Misc. PPRs. Amounts are independent of increases and reductions as allowed by the IOPP.
- 6. Assumes SDCWA does not elect termination in year 35.
- 7. Assumes SDCWA and IID mutually consent to renewal term of 30 years.
- 8. Modified from 100 KAFY in CRWDA Exhibit B; stating in 2018 MWD will provide CVWD 50 KAFY of the 100 KAFY.

Source: CRWDA: Federal QSA Exhibit B, p 13; updated values from 2019 QSA Implementation Report

Due to limits on annual consumptive use of Colorado River water under the QSA/Transfer Agreements, IID's water supply during a normal year is best represented by the CRWDA Exhibit B Net Available for Consumptive Use (Table 14, Column 11). The annual volume is IID Priority 3(a) Quantified Amount of 3.1 million acre-feet (MAF) (Table 14, Column 2) less the IID transfer program reductions for each year (Table 14, Columns 3-9). IID suggests Table 14 which assumes full use of IID's quantified water supply, be used in determining base normal year water availability.

CRWDA Exhibit B Net Available for Consumptive Use volumes less system operation demand represents the amount of water available for delivery by IID Water Department to its customers each year. In a normal year, perhaps 50,000 to 100,000 AF of effective rainfall would fall in the IID water service area. However, rainfall is not evenly distributed throughout the IID water service area and is not taken into account by IID in the submittal of its Estimate of Diversion (annual water order) to the USBR.

Expected Water Availability – Single Dry and Multiple Dry Years

When drought conditions exist within the IID water service area, as has been the case for the past decade or so, the water supply available to meet agricultural and non-agricultural water demands remains the same as normal year water supply because IID continues to rely solely on its entitlement for Colorado River water. Due to the priority of IID water rights and other agreements, drought conditions affecting Colorado River water supplies cause shortages for Arizona, Nevada and Mexico, before impacting California and IID. Accordingly, the Net Available for Consumptive Use volumes in **Table 14**, **Column 11** represents the water supply at Imperial Dam available for diversion by IID in single-dry year and multiple-dry year scenarios.

Under CRWDA Inadvertent Overrun Payback Policy (IOPP), IID has some flexibility to manage its water use. When the water level in Lake Mead is above 1,125 feet, an overrun of its USBR approved annual water order is permissible, and IID has up to three years to pay water use above the annual water order. When Lake Mead's water level is at or below 1,125 feet on January 1 in the calendar

year after the overrun is reported in the USBR Lower Colorado Region Decree Accounting Report, the IOPP prohibits additional overruns and requires that outstanding overruns be paid back in the

subsequent calendar year rather than in three years as allowed under normal conditions; that is, the payback is to be made in the calendar year following publication of the overrun in the USBR Decree Accounting Report. For historic IID annual rainfall, net consumptive use, transfers and IID underrun/overrun amounts see Table 14. For the purposes of the WSA, years with a shortage condition that impacts non-agricultural projects such as an IOPP payback obligation constitute "dry" years for IID.

In years of inadvertent overrun payback, conditions such as those in Sections 3.7 and 3.8 of the 2012 IWSP Water Agreement may go into effect, with the result that less water would be available for non-agricultural development contractors. Under such conditions, IID has requested that **Orni 30 LLC's** (a subsidiary company of Ormat Technologies, Inc.), management work with IID to ensure it can manage the reduction. IID has further indicated that, provided a water supply agreement is approved and executed by IID under the provisions of the IWSP, IID will have sufficient water to support the water of this Project.

Table 15: IID Annual Rainfall (In), Net Consumptive Use and Underrun/Overrun Amounts (AF), 1988-2020

Year	IID Total Annual Rainfall	IID Water Users	IID/MWD Transfer	IID/ SDCWA	SDCWA Transfer Salton Sea	IID Underrun	IID/CVWD Transfer	AAC Lining
				Transfer	Mitigation	/ Overrun		
1988		2,947,581						
1989		3,009,451						
1990	91,104	3,054,188	6,110					
1991	192,671	2,898,963	26,700					
1992	375,955	2,575,659	33,929					
1993	288,081	2,772,148	54,830					
1994	137,226	3,048,076	72,870					
1995	159,189	3,070,582	74,570					
1996	78,507	3,159,609	90,880					
1997	64,407	3,158,486	97,740					
1998	100,092	3,101,548	107,160					
1999	67,854	3,088,980	108,500					
2000	29,642	3,112,770	109,460					
2001	12,850	3,089,911	106,880					
2002	12,850	3,152,984	104,940					
2003	116,232	2,978,223	105,130	10,000	0	6,555		
2004	199,358	2,743,909	101,900	20,000	15,000	-166,408		
2005	202,983	2,756,846	101,940	30,000	15,000	-159,881		
2006	19,893	2,909,680	101,160	40,000	20,000	12,414		
2007	64,580	2,872,754	105,000	50,000	25,021	6,358		
2008	63,124	2,825,116	105,000	50,000	26,085	-47,999	4,000	8,898
2009	30,0354	2,566,713	105,000	60,000	30,158	-237,767	8,000	65,577
2010	189,566	2,545,593	105,000	70,000	33,736	-207,925	12,000	67,700
2011	109,703	2,915,784	103,940	63,278	0	82,662	16,000	67,700
2012	133,526	2,903,216	104,140	106,722	15,182	134,076	21,000	67,700
2013	134,497	2,554,845	105,000	100,000	71,398	-64,981	26,000	67,700
2014	53,517	2,533,414	104,100	100,000	89,168	797	31,000	67,700
2015	97,039	2,480,933	107,820	100,000	153,327	-90,025	36,000	67,700
2016	90,586	2,504,258	105,000	100,000	130,796	-62,497	41,000	67,700
2017	105,919	2,548,164	105,000	100,000	105,311	-30,591	45,000	67,700
2018	63,318	2,625,422	105,000	130,000	0	0	63,000	67,700
2019	146,384	2,558,136	105,000	160,000	46,555	-34,215	68,000	67,700
2020	129,693	2,493,661	105,000	192,500	0	-95,715	73,000	67,700

Notes: Volumes in acre-feet and except Total Annual Rainfall are USBR Decree Accounting Report record at Imperial Dam.

IID Total Annual Rainfall from IID Provisional Water Balance, first available calculations are for 1990

Not all IID QSA programs are shown on this table.

Source: <u>USBR Decree Accounting reports</u>, except IID Total Rainfall and IID Overrun/Underrun is a separate calculation

Source: 2019 IID QSA Implementation Report and 2020 IID SWRCB Report, page 31 of 335; IID Total Rainfall and IID Overrun/ Underrun is a separate calculation

Equitable Distribution Plan

A 2006 study by Hanemann and Brookes suggested that such conditions were likely to occur 40-50% of the years during the decade following the report. On November 28, 2006, the IID Board of Directors adopted Resolution No 22-2006 approving development and implementation of an Equitable Distribution Plan to deal with times when customers' demand would exceed IID's Colorado River supply. The EDP, adopted in 2007 allows the IID Board to institute an apportionment program. As part of this Resolution, the IID Board directed the General Manager to prepare the rules and regulations necessary or appropriate to implement the plan within the district, which the board adopted in November 2006. The 2009 Regulations for EDP were created to enable IID to implement a water management tool (apportionment) to address years in which water demand is expected to exceed supply. So far, for the 17 years from 2003 through 2020, demand has exceeded supply by some amount for a total of five years (see Table 15, above). IID has not experienced any overruns since 2012.

The IID 2013 Revised EDP, adopted by the Board on October 28, 2013, further allowed IID to pay back its outstanding overruns using an EDP Apportionment, and it was expected that an annual EDP Apportionment would be established for each of the next several years, if not for the duration of the QSA/Transfer Agreements. For purposes of this WSA, years with a shortage condition that impacts non-agricultural projects such as an IOPP payback obligation constitute "dry" years for IID. For single-dry year and multiple-dry water year assessments, IID's EDP shall govern. IOPP payback, EDP Apportionment, and the IWSP are further discussed under single-dry and multiple-dry year projections. However, the implementation of the EDP apportionment was legally challenged, and on February 6, 2018, the IID board approved a resolution repealing the EDP until the issue is resolved. As of the date of this WSA, a resolution had been reached, but a modified EDP has yet to be reinstated.

WATER MANAGEMENT UNDER INADVERTENT OVERRUN PAYBACK POLICY (IOPP)

On January 1, 2013, the water level in Lake Mead was 1,120.5 feet and for the first time since the IOPP came into effect, Lower Colorado River Basin water users faced a shortage condition (Figure 7). For IID, this means that outstanding overruns must be paid back to the river in calendar years following the shortage (2013 and 2014) as described below and shown in Table 16.

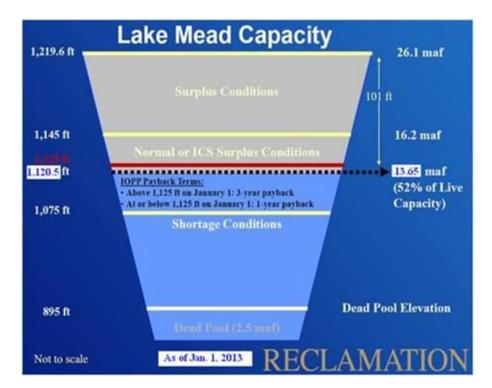


Figure 7 Lake Mead IOPP Schematic

IID's maximum allowable cumulative overrun account is 62,000 AF..²⁸ Thus, for IID's 2011 overrun of 82,662 AF (which was published in 2012), 62,000 AF were paid back at the river in calendar year 2013, with the remaining 20,662 AF paid back in 2014; however, due to an early payback of 6,290 AF in 2012, IID had 55,710 AF to pay back in 2013 and 20,662 AF of the 2011 overrun to pay back in 2014. In addition, because of the low level of Lake Mead on Jan 1, 2013, IID's entire 2012 overrun of 134,076 AF was paid back in 2014, for a total of 154,738 AF in 2014. Furthermore,

²⁸ For IID Quantified Amount: 3.1 MAFY *10 percent = 310,000 AF allowable cumulative overrun account amount; minimum repayment in a calendar year is the less of 310,000 * 20 percent = 62,000 or the amount in the account, if less than 62,000 AF.

under the terms of the IOPP, no overruns are allowed in year when payback is required. IID has not experienced any overrun payback since 2014.

Table 16: IID Inadvertent Overrun Payback to the Colorado River under the IOPP, 2012-2020

Calendar Year of Payback	2011 Overrun Payback (AF)	2012 Overrun Payback (AF)	Payback Total for 2014 Calendar Year (AF)
2013	55,710	-	55,710
2014	20,662	134,076	154,738
Total Payback	76,372	134,076	210,448

The 2013 IOPP payback obligation and prohibition on overruns in payback years, led the IID Board to implement an apportionment program pursuant to the 2009 Regulations for EDP, which were subsequently revised and modified. The Revised 2013 EDP was version approved and adopted by the IID Board on October 28, 2013 (see Attachment B). The Revised 2013 EDP also establishes an agriculture water clearinghouse to facilitate the movement of apportioned water between agricultural water users and between farm units. This is to allow growers and IID to balance water demands for different types of crops and soils with the apportionment s that are made. IID's Water Conservation Committee agreed on a July 1, 2013 start date for the agricultural water clearinghouse.

Generally, the EDP Apportionment is not expected to impact industrial use. However, given the possibility of continuing drought on the Colorado River and other stressors, provisions such as the 2012 IWSP Water Agreement sections 3.7 and 3.8 as well for dry and multiple dry year water assessment may come into effect. However, IID has agreed to work with Project proponents to ensure to the extent possible that the IWSP Water Agreement terms will not negatively impact Project operation.

PROJECT WATER AVAILABILITY FOR A 30-YEAR PERIOD TO MEET PROJECTED DEMANDS

The proposed Project will obtain drinking water from a certified State of California provider via a local vendor who is authorized to haul potable water to the project site and verified through purchase agreement to Imperial County Environmental Health and Safety.

Untreated Colorado River water will be supplied via the adjacent Best canal, gate's 110, 113, 114, & 115 under an Industrial Water Supply Agreement with IID. The untreated Colorado River water will be used solely for periodic panel washing, fire suppression and dust mitigation as previously stated. The applicant will be accepting an agreement with a local vendor for potable water needs. The applicant is required to enter into an IWSP Water Supply Agreement with IID and Schedule 7. General Industrial Use.`

The current land use is agricultural land, the proposed Project will undergo a CUP and a General Plan Amendment for parcels 037-140-005, -022 and -023. The reason for the General Plan Amendment is due to the fact that project site is situated just outside the Renewable Energy Overlay area, no Zone Change is needed because the zoning for agricultural zoning is maintained. The project site is currently receiving water from Best Canal, gates 110, 113, 114 and 115. The project water delivery will decrease from the overall current and historic use of water by 831.63AFY. The canal gates are currently in working condition.

Imperial County Entitlement Discretionary Permits for the Project Include:

- Imperial County Planning Department General Plan Amendment
- Imperial County Planning Department Conditional Use Permit
- Imperial County Planning Department Certification of the EIR

Subsequent ministerial approvals for the Project may include, but are not limited to:

- Grading and clearing permits
- Building permits
- Reclamation plan
- Encroachment permits
- Transportation permit(s)

As noted previously, under the terms of California legislation adopted to facilitate the QSA/Transfer Agreement and enacted in CWCW Section 1013, the IID board adopted TLCEP to address how to deal with any such temporary reductions of water use by projects like such sola project that are developed under a CUP.

While conserved water generated from the TLCFP is limited by law for use for water transfer or environmental purposes, by satisfying multiple districts objectives the TLCFP severs to reduce the need for efficiency conservation and other water use reductions practices on the part f IID and its water users providing the districts with wide benefits. One of the considerations in developing the TLCFP was to provide agricultural land owners with long term assurances from IID that, at Project termination irrigation services would be available for them to resume farming operations.

INTERIM WATER SUPPLY POLICY WATER

At the present time, IID is providing water for use by solar energy generation projects under Water Rate <u>Schedule 7 General Industrial Use.</u> If IID determines that the proposed Project should obtain water under IID's Interim Water Supply Policy (IWSP) for non-agricultural projects rather than <u>Schedule 7 General Industrial Use</u>, the Applicant will do so. IID will determine whether the Project

should obtain water under IID's Interim Water Supply Policy (IWSP) for non-agricultural projects in addition to Schedule 7 General Industrial Water.

The IWSP, provided herein as Attachment A, designates up to 25,000 AFY of water for potential Non-Agricultural Projects within IID's water service area. As of September 2021, IID has 23,800 AF available under the IWSP for new projects such as the proposed project. The IWSP establishes a schedule for Processing Fees, Reservation Fees, and Connection Fees that change each year for all non-agricultural projects, and annual Water Supply Development fees for some non-agricultural projects. The proposed Project's water use will be subject to the annual Water Supply Development fee if IID determines that water for the Project is to be supplied under the IWSP.

The likelihood that IID will not receive its annual 3.1 MAF apportionment less QSA/Transfer Agreement obligations of Colorado River water is low due to the high priority of the IID entitlement relative to other Colorado River contractors, see IID's Water Rights section on page 17. If such reductions were to come into effect within the 20-year Project life, the Applicants are to work with IID to ensure any reduction can be managed.

As such, lower Colorado River water shortage does not present a material risk to the available water supply that would prevent the County from making the findings necessary to approve this WSA. IID, like any water provider, has jurisdiction to manage the water supply within its service area and impose conservation measures during a period of temporary water shortage. Furthermore, without the proposed Project, IID's task of managing water supply under the QSA/Transfer Agreements would be more difficult, because agricultural use on the proposed Project site would be significantly higher than the proposed demand for the proposed Project as explained in the Expected Water Demands for the Proposed Project on the section that follows.

Water for construction (primarily for dust control) would be obtained from IID canals or laterals in conformance with IID rules and regulations for MCI temporary water use.²⁹ Water would be picked

 $^{^{29}}$ Complete the Application for Temporary Water Use and submit to Division office. Complete encroachment permit through Real Estate - non-

up from a nearby canal or lateral and delivered to the construction location by a water truck capable of carrying approximately 4,000 gallons per load. To obtain water delivery service, the Project proponent will complete an <u>IID-410 Certificate of Ownership and Authorization (Water Card)</u>, which allows the Water Department to provide the district with information needed to manage the district apportioned supply. Water cards are used for Agriculture, Municipal, Industrial and Service Pipe accounts. If water is to be provided under IWSP in addition to Schedule 7. General Industrial Use, the Applicant will seek to enter into a IWSP Water Supply Agreement.

EXPECTED WATER DEMANDS FOR THE APPLICANT

Water for the proposed Project will be needed on-site for panel washing, fire suppression and dust mitigation see Table 17 use. water will be supplied to the Project via the adjacent Best Canal Gates, 110, 113, 114, and 115. Untreated Colorado River water will be supplied via the adjacent canal under an Industrial Water Supply Agreement. The untreated Colorado River water will be used solely for periodic panel washing, fire suppression and dust mitigation as previously stated. The applicant is required to enter into an IWSP Water Supply Agreement with IID and will be subject to Schedule 7. General Industrial Use.`

The current land use is agricultural land, the Project will undergo a CUP and a General Plan Amendment for parcels 037-140-005, -022, -023. Reason for the General Plan Amendment is needed since it is just outside the Renewable Energy Overlay area, no Zone Change is needed because the zoning for agricultural zoning is maintained. The project site is currently receiving water from Best Canal 110, 113, 114 and 115. The project water delivery will decrease from the overall current and historic use of water. The Project is anticipated to use approximately 3.1 AFY of water to operate a solar facility please refer to Table 2.. Projected raw water uses are summarized in Table 17.

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refundable application fee of \$250, se. IID website: Real Estate / Encroachments, Permissions, and Other Permitting. Fee for temporary service water: Schedule No. 7 General Industrial Use / Temporary Service Minimum charge for up to 5 AF, pay full flat fee for 5 AF at General Industrial Use rate (\$425); use more than 5 AF, pay fee for actual use at General Industrial Rate (\$85/AF).

Table 17 Project Water Uses (AFY)

Water Use	Single-Year Use	AFY
Raw Water for Operations (Panel Washing) & Mitigation (Dust & Fire) (Years 28 ³⁰)		3.1 AFY
Construction Water (Year 1) ³¹	32.5 AF	0 AFY
Decommissioning Water (1 Year)	32.5 AF	OAFY
Total Raw Water Usage	151.8 AF	86.8AF

IID delivers untreated Colorado River water to the proposed Project site for agricultural uses through the following gates and laterals. The 10-year record for 2011-2020 of water delivery accounting is shown in

Table 18. and has a ten-year 737.2 historic average in AFY.

Table 18 Ten-Year Historic Delivery (AFY), 2011-2020

Canal/Gate	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Best 115	0	0	226.9	412.3	435.8	425.0	307.9	513.8	417.3	317.2
Best 114	0	0	136.9	230.9	259.2	257.0	262.0	340.9	381.1	247.2
Best 113	0	0	111.4	286.1	212.8	223.4	350.5	282.8	197.2	247.5
Best 110	0	0	127.4	161.4	172.6	142.4	121.9	171.0	204.5	163.0
Total	0	0	602.6	1090.7	1080.4	1047.8	1042.3	1308.5	1200.1	974.9

Source: IID Staff, June 2, 2021 (Jose Moreno)

The proposed Project has an estimated total water demand of 151.8 AF or 5.06 AFY amortized over a 30-year term (for all delivery gates for Project). Thus, the proposed Project demand is a reduction of 831.63 AFY from the historical 10-year average or 99 percent (99%) less than the historic 10-year average annual delivery for agricultural uses at the proposed Project site. The proposed Project's estimated water demand represents only .02% of the 23,800 AFY balance of supply available for contracting under the IWSP.

³⁰ 180,000 gallons of water will need to be stored on-site during operation for Fire Suppression needs per Imperial County Fire Department standards.

³¹ 20,000 gallons of water will need to be stored on-site during construction per Imperial County Fire Department standards.

IID's Ability to Meet Demands With Water Supply

Non-agricultural water demands for the IID water service area are projected for 2025-2055 in Table 8, and IID agricultural demands including system operation are projected for 2025-2055 in

Table 9, all volumes within the IID water service area. IID water supplies available for consumptive use after accounting for mandatory transfers are projected to 2077 in Table 14 (Column 11), volumes at Imperial Dam.

To assess IID's ability to meet future water demands, IID historic and forecasted demands are compared with CRWDA Exhibit B net availability, volumes at Imperial Dam Table 14 (Column 11). The analysis requires accounting for system operation consumptive use within the IID water service area, from AAC at Mesa Lateral 5 to Imperial Dam, and for water pumped for use by the USBR Lower Colorado Water Supply Project (LCRWSP), an IID consumptive use component in the USBR Decree Accounting Report. IID system operation consumptive use for 2015 is provided in Table 19-to show the components included in the calculation and their 2015 volumes.

Table 19 IID System Operations Consumptive Use within IID Water Service Area and from AAC at Mesa Lateral 5 to Imperial Dam, (KAF), 2020

	Consumptive Use (KAF)
IID Delivery System Evaporation	24.4
IID Canal Seepage	90.8
IID Main Canal Spill	10.0
IID Lateral Canal Spill	121.5
IID Seepage Interception	-39.0
IID Unaccounted Canal Water	-40.0
Total IID System Operational Use, within water service area	167.8
"Losses" from AAC @ Mesa Lat 5 to Imperial Dam	9.2
LCWSP pump age	-10
Total System Operational Use in 2020	167.0

Sources: 2020 Water Balance rerun 01/25/2021, and 2016 IID Water Conservation Plan

IID's ability to meet customer water demands through 2055 are shown in Table 20.

- Non-agricultural use from Table 8
- Agricultural and Salton Sea mitigation uses from Table 9
- CRWDA Exhibit B net available for IID consumptive use from Table 14
- System operation consumptive use from Table 19

Table 20: IID Historic and Forecasted Consumptive Use vs CRWDA Exhibit B IID Net Available Consumptive Use, volumes at Imperial Dam (KAFY), 2015-2055

	2015	2020	2025	2030	2035	2040	2045	2050	2055
Non-Ag Delivery	110.1	115.2	133.1	142.9	151.4	163.2	175.4	188.4	199.3
Ag Delivery	2,156.8	2,165.4	2,259.5	2,209.5	2,209.5	2,209.5	2,209.5	2,209.5	2,209.5
QSA SS Mitigation Delivery	153.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
System Op CU in IID & to Imperial Dam	220.2	167.0	230.5	225.4	225.4	225.4	225.4	225.4	225.4
IID CU at Imperial Dam	2,480.9	2,493.7	2,623.1	2,577.8	2,586.3	2,598.1	2,610.3	2,623.3	2,634.2
Exhibit B IID Net Available for CU at Imperial Dam	2,480.9	2,652.0	2,617.8	2,612.8	2,612.8	2,612.8	2,612.8	2,665.8	2,665.8
IID Underrun/Overrun at Imperial Dam	-90.0	-98.1	-5.30	35.00	26.50	14.70	2.50	42.50	31.60

Notes: 2015 Provisional Water Balance rerun 06/28/2019

Non-Ag Delivery CI 15.0%, Ag Delivery CI 3.0%, QSA SS mitigation CI 15%

QSA Salton Sea Mitigation Delivery terminates on 12/31/2017

Underrun / Overrun = IID CU at Imperial Dam minus CRWDA Exhibit B Net Available

Notes: Ag Delivery for 2020-2055 does not take into account land conversion for solar use nor reduction in agricultural land area due to urban expansion.

As shown above, IID forecasted demand has the potential to exceed CRWDA Exhibit B Net Consumptive Use volumes during several time intervals through the lifespan projection for the Project. However, due to temporary land conversion for solar use and urban land expansion that will reduce agricultural acres in the future, a water savings of approximately 217,000 AFY will be generated into the future and for the lifetime of the Project.

In addition, USBR 2020 Decree Accounting Report states that IID Consumptive Use is 2,493.7 KAF (excludes 1,579 AF of ICS for Storage in Lake Mead and an additional 49,444 AF of conserved water left on the Colorado River system) with an underrun of -98.1 KAF, as reported by IID in 2020 Annual SWRCB Report per WRO 2002-2013; that is, IID uses less than the amount in its approved Water Order (2,615,300 AF).

Table 21: 2020 Approved Water Order, Actual CU (Decree Accounting Report) and IID Underrun, KAF at Imperial Dam

Sources: 2020 IID Revised Water Order, approved on March 10, 2020, 2020 Decree Accounting Report, and 2020 Annual Report of IID Pursuant to SWRCB Revised Order WRO 2002-2013				
IID Underrun /Overrun -98.1				
IID Consumptive Use	2,493.7			
IID Approved Water Order	2,625.3 less 10 supplied by LCWSP and less 26 of additional water			

As reported in the 2020 QSA Implementation Report and 2020 SWRCB IID Report and presented in Table 20 from 2013 to 2020 IID consumptive use (CU) resulted in underruns; i.e., annual CU was less than the district's QSA Entitlement of 3.1 MAFY minus QSA/Transfer Agreements obligations. This would indicate that even though Table 10 shows IID Overrun/Underrun at Imperial Dam exceeding CRWDA Exhibit B Net Available for CU, for the 30-year life of the proposed Project, IID consumptive use may be less than forecasted. However, with repeal of the IID EDP in February 2018, it is uncertain whether underruns will continue.

Meanwhile, forecasted Ag Delivery reductions presented in **Table 9** are premised on implementation of on-farm practices that will result in efficiency conservation. These reductions do not take into account land conversion for solar projects nor reduction in agricultural land area due to urban expansion; that is to say, the forecasted Ag Delivery is for acreage in 2003 with reduction for projected on-farm conservation efficiency. Thus, Ag Delivery demand may well be less than forecasted in **Table 9**. In any case, the proposed Project will use less water than the historical agricultural demand of proposed Project site, so the proposed Project will ease rather than exacerbate overall IID water demands.

In the event that IID has issued water supply agreements that exhaust the 25 KAFY IWSP set aside, and it becomes apparent that IID delivery demands due to non-agriculture use are going to cause the district to exceed its quantified 3.1 MAFY entitlement less QSA/Transfer Agreements obligations, IID has identified options to meet these new non-agricultural demands. These options include (1) tracking water yield from temporary land conversion from agricultural to non-

agricultural land uses (renewable solar energy); and (2) only if necessary, developing projects to expand the size of the district's water supply portfolio.

These factors will be discussed in the next two sections, Tracking Water Savings from Growth of Non-Agricultural land Uses and Expanding Water Supply Portfolio.

Tracking Water Savings from Growth of Non-Agricultural Land Uses

The Imperial County Board of Supervisors has targeted up to 25,000 acres of agricultural lands, about 5 percent (5%) of the farmable acreage served by IID, for temporary conversion to solar farms; because the board found that this level of reduction would not adversely affect agricultural production. As reported for IID's 2020 Temporary Land Conversion Fallowing Program existing solar developments at the end of 2020 have converted 12,404 acres of farmland. These projects had a yield at-river of 65,964 AF of water in 2020. The balance of the 25,000-acre agriculture-to-solar policy is 12,596 acres. On average, each agricultural acre converted reduces agricultural demand by 5.1 AFY, which results in a total at-river yield (reduction in consumptive use) of 127,500 AFY.

However, due to the nature of the conditional use permits under which solar farms are developed, IID cannot rely on this supply being permanently available. In fact, should a solar project decommission early, that land may go immediately back to agricultural use (it remains zoned an agricultural land). Nevertheless, during their operation, the solar farms do ameliorate pressure on IID to implement projects to meet demand from new non-agricultural projects.

Unlike the impact of solar projects, other non-agricultural uses are projected to grow, as reflected in the nearly 55 percent (55%) increase in non-agricultural water demand from 107.4 KAF in 2015 to 201.4 KAF in 2055 reflected herein in **Table 8**. This increase in demand of 94 KAFY will more than likely be met by solar development; however, as the land remains zoned as agricultural land, that source is not reliable to be permanently available to IID.

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The amount of land developed for residential, commercial, and industrial purposes is projected to grow by 55,733 acres from 2015 to 2050³² within the sphere of influence of the incorporated cities and specific plan areas in Imperial County. A conservative estimate is that such development will displace at least another 24,500 acres of farmland based on the Imperial County Local Agency Formation Commission (LAFCO) sphere of influence maps and existing zoning and land use in Imperial County. At 5.13 AFY yield at-river, there would be a 125,000 AFY reduction IID net consumptive use.

The total foreseeable solar project temporary yield at-river (91,800 AFY) and municipal development permanent yield at-river (125,000 AFY) is to reduce forecasted IID net consumptive use at-river 216,800 AFY, which is more than enough to meet the forecast Demand minus Exhibit B Net Available volumes shown in <u>Table 14</u>. This Yield at-river is sufficient to meet the forecasted excess of non-agricultural use over Net Available supply within the IID service area for the next 20 years, as is required for SB 610 analysis.

Farmland retirement associated with municipal development would reduce IID agricultural delivery requirements beyond the efficiency conservation projections shown in **Table 9.** Therefore, in the event that <u>Schedule 7 General Industrial Use</u> water is unavailable, the Applicants will rely on IID IWSP water to supply the Project, as discussed above in the section **IID Water Supply Policy for Non-Agricultural Projects (September 2009).**

EXPANDING WATER SUPPLY PORTFOLIO

While forecasted long-term annual yield-at-river from the reduction in agricultural acreage due to municipal development in the IID service area is sufficient to meet the forecasted excess of non-agricultural use over CRWDA Net Available supply (**Table 14**) without expanding IID's Water Supply Portfolio, IID has also evaluated the feasibility of a number of capital projects to increase its water supply portfolio.

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³² IRWMP, Chapter 5, Table 5-14

As reported in 2012 Imperial IRWMP Chapter 12, IID contracted with GEI Consultants, Inc. to identify a range of capital project alternatives that the district could implement. Qualitative and quantitative screening criteria and assumptions were developed in consultation with IID staff. Locations within the IID water service area with physical, geographical, and environmental characteristics most suited to implementing short- and long-term alternatives were identified. Technical project evaluation criteria included volumes of water that could be delivered and/or stored by each project, regulatory and permitting complexity, preliminary engineering components, land use requirements, and costs.

After preliminary evaluation, a total of 27 projects were configured:

- 17 groundwater or drain water desalination
- 2 groundwater blending
- 6 recycled water
- 1 groundwater banking
- 1 IID system conservation (concrete lining)

Projects were assessed at a reconnaissance level to allow for comparison of project costs. IID staff and the board identified key factors to categorize project alternatives and establish priorities. Lower priority projects were less feasible due to technical, political, or financial constraints. Preferential criteria were features that increased the relative benefits of a project and grant it a higher priority. Four criteria were used to prioritize the IID capital projects:

- 1. **Financial Feasibility.** Projects whose unit cost was more than \$600/AF were eliminated from further consideration.
- 2. **Annual Yield.** Project alternatives generating 5,000 AF or less of total annual yield were determined not to be cost-effective and lacking necessary economies of scale.

- 3. **Groundwater Banking.** Groundwater banking to capture and store underruns is recognized as a beneficial use of Colorado River water. Project alternatives without groundwater banking were given a lower priority.
- 4. **Partnering.** Project alternatives in which IID was dependent on others (private and/or public agencies) for implementation were considered to have a lower priority in the IID review; this criterion was reserved for the IRWMP process, where partnering is a desirable attribute.

Based on these criteria, the top ten water expansion included six desalination, two groundwater blending, one system conservation, and one groundwater storage capital projects. These capital projects are listed *Table 22 IID Capital Project Alternatives and Cost (May 2009 price levels \$)* which follows.

Table 22 IID Capital Project Alternatives and Cost (May 2009 price levels \$)

Name	Description	Capital	O&M	Equivalent	Unit Cost	In-Valley
Name	Description	Cost	Cost	Annual Cost	(\$/AF)	Yield (AF)
GW 18	Groundwater Blending E. Mesa Well Field Pumping to AAC	\$39,501,517	\$198,000	\$2,482,000	\$99	25,000
GW 19	Groundwater Blending: E. Mesa Well Field Pumping to AAC w/Percolation Ponds	\$48,605,551	\$243,000	\$3,054,000	\$122	25,000
WB 1	Coachella Valley Groundwater Storage	\$92,200,000	\$7,544,000	\$5,736,746	\$266	50,000
DES 8	E. Brawley Desalination with Well Field and Groundwater Recharge	\$100,991,177	\$6,166,000	\$12,006,000	\$480	25,000
AWC 1	IID System Conservation Projects	\$56,225,000	N/A	\$4,068,000	\$504	8,000
DES 12	East Mesa Desalination with Well Field and Groundwater Recharge	\$112,318,224	\$6,336,000	\$12,831,000	\$513	25,000
DES 4	Keystone Desalination with IID Drain water/ Alamo River	\$147,437,743	\$15,323,901	\$23,849,901	\$477	50,000
DES 14	So. Salton Sea Desalination with Alamo River Water and Industrial Distribution	\$158,619,378	\$15,491,901	\$24,664,901	\$493	50,000
DES 15	So. Salton Sea Desalination with Alamo River Water and MCI Distribution	\$182,975,327	\$15,857,901	\$26,438,901	\$529	50,000
DES 2	Keystone Desalination with Well Field and Groundwater Recharge	\$282,399,468	\$13,158,000	\$29,489,000	\$590	50,000

Source: Imperial IRWMP, Chapter 12; see also Imperial IRWMP Appendix N, IID Capital Projects

IID Near Term Water Supply Projections

As mentioned above, IID's quantified Priority 3(a) water right under the QSA/Transfer Agreements secures 3.1 MAF per year, less transfer obligations of water for IID's use from the Colorado River, without relying on rainfall in the IID service area. Even with this strong entitlement to water, IID actively promotes on-farm efficiency conservation and is implementing system efficiency conservation measures including seepage recovery from IID canals and the All-American Canal (ACC) and measures to reduce operational discharge. As the IID website <u>Water Department</u> states:

Through the implementation of extraordinary conservation projects, the development of innovative efficiency measures and the utilization of progressive management tools, the IID Water Department is working to ensure both the long-term viability of agriculture and the continued protection of water resources within its service area.

Overall, agricultural water demand in the Imperial Valley will decrease due to IID system and grower on-farm efficiency conservation measures that are designed to maintain agricultural productivity at pre-QSA levels while producing sufficient yield-at-river to meet IID's QSA/Transfer Agreements obligations. These efficiencies combined with the conversion of some agricultural land uses to non-agricultural land uses (both solar and municipal), ensure that IID can continue to meet the water delivery demand of its existing and future agricultural and non-agricultural water users, including this Project for the next 30 years and for the life of the proposed Project.

PUBLIC WATER SYSTEM/ LEAD AGENCY FINDINGS

IID serves as the regional wholesale water supplier, importing raw Colorado River water and delivering it, untreated, to agricultural, municipal, industrial, environmental, and recreational water users within its Imperial Unit water service area. The County of Imperial serves as the responsible agency with land use authority over the proposed project. Water Assessment findings are summarized as follows:

- 1. IID's annual entitlement to consumptive use of Colorado River water is capped at 3.1 MAF less water transfer obligations, pursuant to the QSA and Related Agreements. Under the terms of the CRWDA, IID is implementing efficiency conservation measure to reduce net consumptive use of Colorado River water needed to meet its QSA/Transfer Agreements obligations while retaining historical levels of agricultural productivity.
- 2. In 2020 IID consumptively used 2,493.661 AF of Colorado River water (volume at Imperial Dam); 2,278,598 AF were delivered to customers (including recreational and environmental water deliveries) of which 2,165,386 AF or 95 percent went to agricultural users as per IID's Water Balance run on 1/25/2021.
- 3. Reduction of IID's net consumptive use of Colorado River water under the terms of the Colorado River Water Delivery Agreement is to be the result of efficiency conservation measures. Agricultural consumptive use in the Imperial Valley will not decline. However, IID operational spill and tailwater will decline, impacting the Salton Sea.
- 4. Due to the dependability of IID's water rights, Colorado River flows, and Colorado River storage facilities for Colorado River water, it is unlikely that the water supply of IID would be disrupted, even in dry years or under shortage conditions because Mexico, Arizona and Nevada have lower priority and are responsible for reducing their water use during a declared Colorado River water shortage before impacting California.
- 5. Historically, IID has never been denied the right to use the annual volume of water it has available for its consumptive uses under its entitlement. Nevertheless, IID is participating in discussions for possible actions in response to extreme drought on the Colorado River.

- 6. The proposed Project has an estimated total water demand of 151.8 AF or 5.06 AFY amortized over a 30-year term (for all delivery gates for Project). Thus, the proposed Project demand is a reduction of 831.63 AFY from the historical 10-year average or 99 percent (99 %) less than the historic 10-year average annual delivery for agricultural uses at the proposed Project site.
- 7. The Project's water use will be covered under the <u>Schedule 7 General Industrial Use</u>. In the event that IID determines that the proposed Project is to utilize IWSP for Non-Agricultural Projects water, the Applicant will enter into an IWSP Water Supply Agreement with IID. In which case, the proposed Project would use .02 percent (.02%) of the 23,800 AFY of IWSP water.
- 8. Based on the Environmental Impact Report (EIR) prepared for this proposed Project pursuant to the CEQA, California Public Resources Code sections 21000, et seq., (SCH No. 2021070424) the Lead Agency hereby finds that the IID projected water supply will be sufficient to satisfy the demands of this proposed Project in addition to existing and planned future uses, including agricultural and non-agricultural uses for a 30-year Water Supply Assessment period and for the 30-year proposed Project life.

Assessment Conclusion

This Water Supply Assessment has determined that IID water supply is adequate for the proposed Project. The Imperial Irrigation District's IWSP for Non-Agricultural Projects dedicates 25,000 AF of IID's annual water supply to serve new projects. As of September 2021, 23,800 AF per year remain available for new projects ensuring reasonably sufficient supplies for new non-agricultural water users. The project water demand of approximately 151.8 AF represents amortized over 30 years equates to 5.06 AFY which is .02% of the unallocated supply set aside in the IWSP for non-agricultural projects, and approximately .02 percent (.02%) of forecasted future non-agricultural water demands planned in the Imperial IRWMP through 2055. The water demand for the proposed project represents a 99% decrease from the historical average agricultural water use for 2011-2020 at the proposed Project site, a reduction in use of 831.63 AFY at full build out.

For all the reasons described herein, the amount of water available and the stability of the IID water supply along with on-farm and system efficiency conservation and other measures being undertaken by IID and its customers ensure that Orni 30, LLC's Brawley Solar Energy Facility Project's water needs will be met for the next 30 years as assessed for compliance under SB-610.

Resources and References

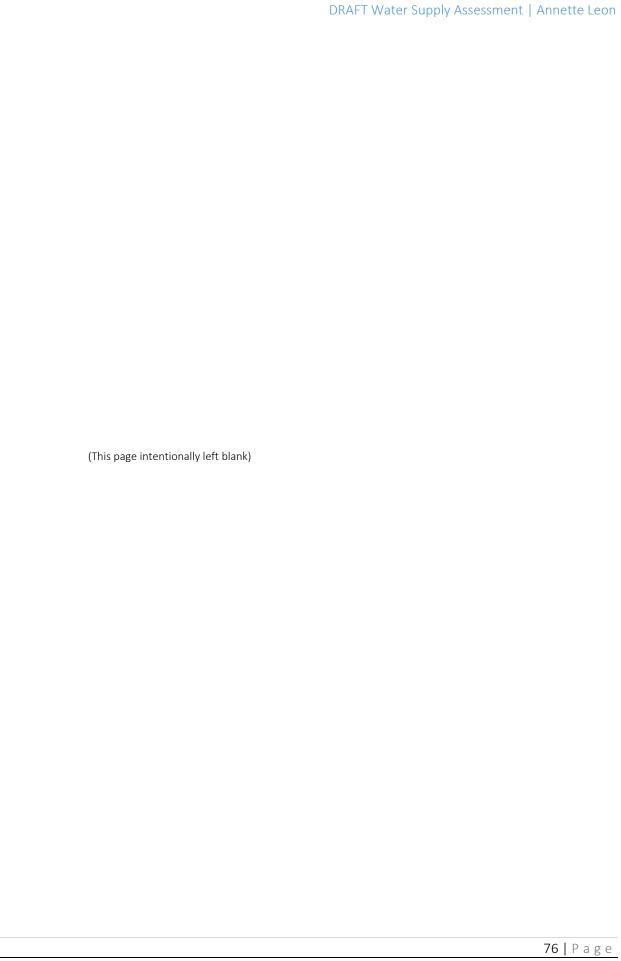
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Attachments

Attachment A

Attachment A: IID Interim Water Supply Policy for Non-Agricultural Projects



Attachment A: IID Interim Water Supply Policy for Non-Agricultural Projects.³³

1.0 Purpose.

Imperial Irrigation District (the District) is developing an Integrated Water Resources Management Plan (IWRMP) ³⁴ that will identify and recommend potential programs and projects to develop new water supplies and new storage, enhance the reliability of existing supplies, and provide more flexibility for District water department operations, all in order to maintain service levels within the District's existing water service area. The first phase of the IWRMP is scheduled to be completed by the end of 2009 and will identify potential projects, implementation strategies and funding sources. Pending development of the IWRMP, the District is adopting this Interim Water Supply Policy (IWSP) for Non-Agricultural Projects, as defined below, in order to address proposed projects that will rely upon a water supply from the District during the time that the IWRMP is still under development. It is anticipated that this IWSP will be modified and/or superseded to take into consideration policies and data developed by the IWRMP.

2.0 Background.

The IWRMP will enable the District to more effectively manage existing water supplies and to maximize the District's ability to store or create water when the available water supplies exceed the demand for such water. The stored water can be made available for later use when there is a higher water demand. Based upon known pending requests to the District for water supply assessments/verifications and pending applications to the County of Imperial for various Non-Agricultural Projects, the District currently estimates that up to 50,000 acre feet per year (AFY) of water could potentially be requested for Non-Agricultural Projects over the next ten to twenty years. Under the IWRMP the District shall evaluate the projected water demand of such projects and the potential means of supplying that amount of water. This IWSP currently designates up to 25,000 AFY of water for potential Non-Agricultural Projects within IID's water service area. Proposed Non-Agricultural projects may be required to pay a Reservation Fee, further described below. The reserved water shall be available for other users until such Non-Agricultural projects are implemented and require the reserved water supply. This IWSP shall remain in effect pending the approval of further policies that will be adopted in association with the IWRMP.

3.0 <u>Terms and Definitions</u>.

3.1 Agricultural Use. Uses of water for irrigation, crop production and leaching.

³³ IID Board Resolution 31-2009. Interim Water Supply Policy for New Non-Agricultural Projects. September 29, 2009. < IID Interim Water Supply Policy for Non-Agricultural Projects>

³⁴ The 2009 Draft IID IWRMP has been superseded by the October 2012 Imperial IRWMP, which incorporates the conditions of the IWSP by reference.

- 3.2 <u>Connection Fee</u>. A fee established by the District to physically connect a new Water User to the District water system.
- 3.3 <u>Industrial Use</u>. Uses of water that are not Agricultural or Municipal, as defined herein, such as manufacturing, mining, cooling water supply, energy generation, hydraulic conveyance, gravel washing, fire protection, oil well re-pressurization and industrial process water.
- 3.4 <u>Municipal Use</u>. Uses of water for commercial, institutional, community, military, or public water systems, whether in municipalities or in unincorporated areas of Imperial County.
- 3.5 Mixed Use. Uses of water that involve a combination of Municipal Use and Industrial Use.
- 3.6 <u>Non-Agricultural Project</u>. Any project which has a water use other than Agricultural Use, as defined herein.
- 3.7 <u>Processing Fee</u>. A fee charged by the District Water Department to reimburse the District for staff time required to process a request for water supply for a Non-Agricultural Project.
- 3.8 Reservation Fee. A non-refundable fee charged by the District when an application for water supply for a Non-Agricultural Project is deemed complete and approved. This fee is intended to offset the cost of setting aside the projected water supply for the project during the period commencing from the completion of the application to start-up of construction of the proposed project and/or execution of a water supply agreement. The initial payment of the Reservation Fee will reserve the projected water supply for up to two years. The Reservations Fee is renewable for up to two additional two-year periods upon payment of an additional fee for each renewal.
- 3.9 <u>Water Supply Development Fee.</u> An annual fee charged to some Non-Agricultural Projects by the District, as further described in Section 5.2 herein. Such fees shall assist in funding IWRMP or related water supply projects,
- 3.10 <u>Water User.</u> A person or entity that orders or receives water service from the District.

4.0. <u>CEQA Compliance</u>.

4.1 The responsibility for CEQA compliance for new development projects within the unincorporated area of the County of Imperial attaches to the County of Imperial or, if the project is within the boundaries of a municipality, the particular municipality, or if the project is subject to the jurisdiction of another agency, such as the California Energy Commission, the particular agency. The District will coordinate with the County of Imperial, relevant municipality, or other agency to help ensure that the water supply component of their respective general plans is comprehensive and based upon current information. Among other things, the general plans should assess the direct, indirect and cumulative potential impacts on the environment of using currently available water supplies for new industrial, municipal, commercial and/or institutional uses instead of the historical use of that water for agriculture. Such a change in land use, and

the associated water use, could potentially impact land uses, various aquatic and terrestrial species, water quality, air quality and the conditions of drains, rivers and the Salton Sea.

4.2 When determining whether to approve a water supply agreement for any Non-Agricultural Project pursuant to this IWSP, the District will consider whether potential environmental and water supply impacts of such proposed projects have been adequately assessed, appropriate mitigation has been developed and appropriate conditions have been adopted by the relevant land use permitting/approving agencies, before the District approves any water supply agreement for such project.

5.0. Applicability of Fees for Non-Agricultural Projects. 35

- Project shall be required to pay a Processing Fee and may be required to pay a Reservation Fee as shown in Table A. All Water Users shall also pay the applicable Connection Fee, if necessary, and regular water service fees according to the District water rate schedules, as modified from time to time.
- 5.2 A Non-Agricultural Project may also be subject to an annual Water Supply Development Fee, depending upon the nature, complexity, and water demands of the proposed project. The District will determine whether a proposed Non-Agricultural Project is subject to the Water Supply Development Fee for water supplied pursuant to this IWSP as follows:
- 5.2.1. A proposed project that will require water for a Municipal Use shall be subject to an annual Water Supply Development Fee as set forth in Table B if the projected water demand for the project is in excess of the project's estimated population multiplied by the District-wide per capita usage. Municipal Use projects without an appreciable residential component will be analyzed under sub-section 5.2.3.
- 5.2.2. A proposed project that will require water for an Industrial Use located in an unincorporated area of the County of Imperial shall be subject to an annual Water Supply Development Fee as set forth in Table B.
- 5.2.3. The applicability of the Water Supply Development Fee set forth in Table B to Mixed Use projects, Industrial Use projects located within a municipality, or Municipal Use projects without an appreciable residential component, will be determined by the District on a case-by-case basis, depending upon the proportion of types of land uses and the water demand proposed for the project.
- 5.3. A proposed Water User for a Non-Agricultural Projects may elect to provide some or all of the required water supply by paying for and implementing some other means of providing water in a manner approved by the District, such as conservation projects, water storage projects and/or use of an alternative source of supply, such as recycled water or some source of water other than from the District water supply. Such election shall require consultation with the District regarding the details of such alternatives and a

³⁵ The most recent fee schedules can be found in a link at IID/Water/ Municipal, Industrial and Commercial Customers; or visit by URL at Imperial Irrigation District: Water Rate Schedules

determination by the District, in its reasonable discretion, concerning how much credit, if any, should be given for such alternative water supply as against the project's water demand for purposes of determining the annual Water Supply Development Fee for such project.

- The District Board shall have the right to modify the fees shown on Tables A and B from time to time.
- 6. Water Supply Development Fees collected by the District under this IWSP shall be accounted for independently, including reasonable accrued interest, and such fees shall only be used to help fund IWRMP or related District water supply projects.
- 7. Any request for water service for a proposed Non-Agricultural Project that meets the criteria for a water supply assessment pursuant to Water Code Sections 10910-10915 or a water supply verification pursuant to Government Code Section 66473.7 shall include all information required by Water Code Sections 10910 –10915 or Government Code Section 66473.7 to enable the District to prepare the water supply assessment or verification. All submittals should include sufficient detail and analysis regarding the project's water demands, including types of land use and per capita water usage, necessary to make the determinations outlined in Section 5.2.
- 8. Any request for water service for a proposed Non-Agricultural Project that does not meet the criteria for a water supply assessment pursuant to Water Code Section 10910-10915 or water supply verification pursuant to Government Code Section 66473.7 shall include a complete project description with a detailed map or diagram depicting the footprint of the proposed project, the size of the footprint, projected water demand at full implementation of the project and a schedule for implementing water service. All submittals should include sufficient detail and analysis regarding the project's water demands, including types of land use and per capita water usage, necessary to make the determinations outlined in Section 5.2.
- 9. All other District rules and policies regarding a project applicant or Water User's responsibility for paying connection fees, costs of capital improvements and reimbursing the District for costs of staff and consultant's time, engineering studies and administrative overhead required to process and implement projects remain in effect.
- 10. Municipal Use customers shall be required to follow appropriate water use efficiency best management practices (BMPs), including, but not limited to those established by the California Urban Water Conservation Council BMP's (see http://www.cuwcc.org/mou/exhibit-1-bmp-definitions-schedules-requirements.aspx), or other water use efficiency standards, adopted by the District or local government agencies.
- 11. Industrial Use customers shall be required to follow appropriate water use efficiency BMP's, including but not limited to those established by the California Urban Water Conservation Council and California Energy Commission, as well as other water use efficiency standards, adopted by the District or local government agencies.

12. Industr	The District may ial Water Users.	prescribe	additional c	or different	BMPs	for certair	categories	of Municipa	l and

Noise Impact Analysis Brawley Solar Energy Facility Project Imperial County

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Project No. 21014

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ACRONYMS AND ABBREVIATIONS

ANSI American National Standards Institute

Caltrans California Department of Transportation

CEQA California Environmental Quality Act

County County of Imperial

CNEL Community Noise Equivalent Level

dB Decibel

dBA A-weighted decibels

DOT Department of Transportation
FHWA Federal Highway Administration

FTA Federal Transit Administration

EPA Environmental Protection Agency

Hz Hertz

Ldn Day-night average noise level

Leq Equivalent sound level
Lmax Maximum noise level

ONAC Federal Office of Noise Abatement and Control

OSB Oriented Strand Board

OSHA Occupational Safety and Health Administration

PPV Peak particle velocity

RMS Root mean square

SEL Single Event Level or Sound Exposure Level

STC Sound Transmission Class

UMTA Federal Urban Mass Transit Administration

VdB Vibration velocity level in decibels

1.0 EXECUTIVE SUMMARY

1.1 Purpose of Analysis and Study Objectives

This Noise Impact Analysis has been prepared to determine the noise impacts associated with the proposed Brawley Solar Energy Facility Project (proposed project). The following is provided in this report:

- A description of the study area and the proposed project;
- Information regarding the fundamentals of noise;
- Information regarding the fundamentals of vibration;
- A description of the local noise guidelines and standards;
- An evaluation of the current noise environment;
- An analysis of the potential short-term construction-related noise impacts from the proposed project; and,
- An analysis of long-term operations-related noise impacts from the proposed project.

1.2 Site Location and Study Area

The project site is located in the County of Imperial (County). The approximately 225-acre project site is currently alfalfa fields within different levels of harvest and is bounded by undeveloped agricultural land to the north and to the east, undeveloped agricultural land and dirt lots used for staging actives to the south, and City of Brawley Wastewater Treatment Plan to the west. The Union Pacific Railroad (UPRR runs through the western portion of the project site in a generally north-south direction. The project study area is shown in Figure 1.

Sensitive Receptors in Project Vicinity

The nearest sensitive receptor to the project site is a single-family home located as near as 40 feet to the north side of the project site (near the northwest corner of the project site). There are also homes located on the east side of Best Avenue that are as near as 120 feet east of the project site. The nearest school is Brawley Union High School and Desert Valley High School, which is located as near as 2.7 miles south of the project site and Barbara Worth Junior High School, which is located as near as 2.8 miles south of the project site.

1.3 Proposed Project Description

The proposed project would consist of development of solar energy facility located at 5003 Best Ave, Brawley. The Brawley solar energy facility includes a 40 Megawatt (MW)/160 Megawatt hour (MWh) photovoltaic (PV) solar farm and 40 MW/160 MWh battery energy storage system (BESS). The BESS will be located on the south side of the project site, approximately in the middle of the project site and the proposed transformers will be located on the west side of the BESS. The BESS will be located on a concrete pad and will consist of 12 banks of enclosures, totaling up to 432 enclosures. Each bank of batteries will be supported by a DC Combiner, control panel and inverter/transformer skid.

Power generated by the proposed project would be low voltage direct current (DC) power that would be collected and routed to a series of inverters and their associated pad-mounted transformers. The inverters

would convert the DC power generated by the panels to alternating current (AC) power and the pad mounted transformers would step up the voltage. The Project would connect to the North Brawley Geothermal Power Plant substation southwest of the Project site via an approximately 1.6-mile-long aboveground 92 kilovolt (kV) generation tie line (gen-tie line). Energy generated and stored by the project will be sold to the wholesale market or retail electric providers in furtherance of the goals of the California Renewable Energy Portfolio Standards and other similar renewable programs in the Pacific Southwest power market. The proposed site plan is shown in Figure 2.

1.4 Standard Noise Regulatory Conditions

The proposed project will be required to comply with the following regulatory conditions from the County of Imperial and State of California.

County of Imperial Noise Regulations

The following lists the noise/land use compatibility standards from the Noise Element of the General Plan that are applicable, but not limited to the proposed project.

- Property Line Noise Standards
- Construction Noise Standards

State of California Noise Regulations

The following lists the State of California noise regulations that are applicable, but not limited to the proposed project.

- California Vehicle Code Section 2700-27207 On Road Vehicle Noise Limits
- California Vehicle Code Section 38365-38350 Off-Road Vehicle Noise Limits

1.5 Summary of Analysis Results

The following is a summary of the proposed project's impacts with regard to the State CEQA Guidelines noise checklist questions.

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.

Generation of excessive groundborne vibration or groundborne noise levels?

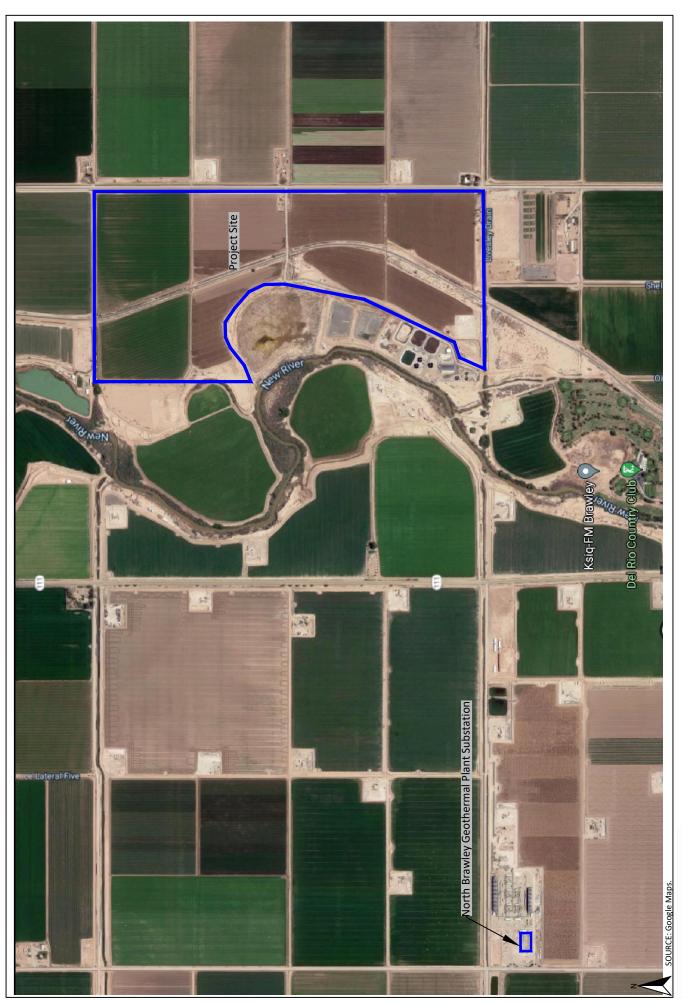
Less than significant impact.

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?

No impact.

1.6 Mitigation Measures for the Proposed Project

This analysis found that through adherence to the noise and vibration regulations detailed in Section 1.4 above, all noise and vibration impacts would be reduced to less than significant levels and no mitigation is required.







2.0 NOISE FUNDAMENTALS

Noise is defined as unwanted sound. Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Sound is produced by the vibration of sound pressure waves in the air. Sound pressure levels are used to measure the intensity of sound and are described in terms of decibels. The decibel (dB) is a logarithmic unit which expresses the ratio of the sound pressure level being measured to a standard reference level. A-weighted decibels (dBA) approximate the subjective response of the human ear to a broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies which are audible to the human ear.

2.1 Noise Descriptors

Noise Equivalent sound levels are not measured directly, but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level (Leq) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. The worst-hour traffic Leq, which is usually the peak traffic hour is the noise metric used by California Department of Transportation (Caltrans) for all traffic noise impact analyses.

The Day-Night Average Level (Ldn) is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time of day corrections require the addition of ten decibels to sound levels at night between 10 p.m. and 7 a.m. The Community Noise Equivalent Level (CNEL) is similar to the Ldn, except that it has an added 4.77 decibels to sound levels during the evening hours between 7 p.m. and 10 p.m. These additions are made to the sound levels at these time periods because during the evening and nighttime hours, when compared to daytime hours, there is a decrease in the ambient noise levels, which creates an increased sensitivity to sounds. For this reason the sound appears louder in the evening and nighttime hours and is weighted accordingly. The County of Imperial also relies on the CNEL noise standard to assess transportation-related impacts on noise sensitive land uses.

2.2 Tone Noise

A pure tone noise is a noise produced at a single frequency and laboratory tests have shown that humans are more perceptible to changes in noise levels of a pure tone. For a noise source to contain a "pure tone," there must be a significantly higher A-weighted sound energy in a given frequency band than in the neighboring bands, thereby causing the noise source to "stand out" against other noise sources. A pure tone occurs if the sound pressure level in the one-third octave band with the tone exceeds the average of the sound pressure levels of the two contiguous one-third octave bands by:

- 5 dB for center frequencies of 500 hertz (Hz) and above
- 8 dB for center frequencies between 160 and 400 Hz
- 15 dB for center frequencies of 125 Hz or less

2.3 Noise Propagation

From the noise source to the receiver, noise changes both in level and frequency spectrum. The most obvious is the decrease in noise as the distance from the source increases. The manner in which noise reduces with distance depends on whether the source is a point or line source as well as ground absorption, atmospheric effects and refraction, and shielding by natural and manmade features. Sound

from point sources, such as air conditioning condensers, radiate uniformly outward as it travels away from the source in a spherical pattern. The noise drop-off rate associated with this geometric spreading is 6 dBA per each doubling of the distance (dBA/DD) between source and receiver. Transportation noise sources such as roadways are typically analyzed as line sources, since at any given moment the receiver may be impacted by noise from multiple vehicles at various locations along the roadway. Because of the geometry of a line source, the noise drop-off rate associated with the geometric spreading of a line source is 3 dBA/DD.

2.4 Ground Absorption

The sound drop-off rate is highly dependent on the conditions of the land between the noise source and receiver. To account for this ground-effect attenuation (absorption), two types of site conditions are commonly used in traffic noise models, soft-site and hard-site conditions. Soft-site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. For point sources, a drop-off rate of 7.5 dBA/DD is typically observed over soft ground with landscaping, as compared with a 6.0 dBA/DD drop-off rate over hard ground such as asphalt, concrete, stone and very hard packed earth. For line sources a 4.5 dBA/DD is typically observed for soft-site conditions compared to the 3.0 dBA/DD drop-off rate for hard-site conditions. Caltrans research has shown that the use of soft-site conditions is more appropriate for the application of the Federal Highway Administration (FHWA) traffic noise prediction model used in this analysis as most ground surfaces between the source and receptor will provide some noise absorption.

3.0 GROUND-BORNE VIBRATION FUNDAMENTALS

Ground-borne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. The effects of ground-borne vibrations typically only cause a nuisance to people, but at extreme vibration levels damage to buildings may occur. Although ground-borne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. Ground-borne noise is an effect of ground-borne vibration and only exists indoors, since it is produced from noise radiated from the motion of the walls and floors of a room and may also consist of the rattling of windows or dishes on shelves.

3.1 Vibration Descriptors

There are several different methods that are used to quantify vibration amplitude such as the maximum instantaneous peak in the vibrations velocity, which is known as the peak particle velocity (PPV) or the root mean square (rms) amplitude of the vibration velocity. Due to the typically small amplitudes of vibrations, vibration velocity is often expressed in decibels and is denoted as (L_v) and is based on the rms velocity amplitude. A commonly used abbreviation is vibration decibels (VdB), which in this text, is when L_v is based on the reference quantity of 1 micro inch per second.

3.2 Vibration Perception

Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. These continuous vibrations are not noticeable to humans whose threshold of perception is around 65 VdB. Offsite sources that may produce perceptible vibrations are usually caused by construction equipment, steelwheeled trains, and traffic on rough roads, while smooth roads rarely produce perceptible ground-borne noise or vibration.

3.3 Vibration Propagation

The propagation of ground-borne vibration is not as simple to model as airborne noise. This is due to the fact that noise in the air travels through a relatively uniform median, while ground-borne vibrations travel through the earth which may contain significant geological differences. There are three main types of vibration propagation; surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wave front, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wave front. However, unlike P-waves, the particle motion is transverse or "side-to-side and perpendicular to the direction of propagation."

As vibration waves propagate from a source, the vibration energy decreases in a logarithmic nature and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration source. As stated above, this drop-off rate can vary greatly depending on the soil but has been shown to be effective enough for screening purposes, in order to identify potential vibration impacts that may need to be studied through actual field tests.

4.0 REGULATORY SETTING

The project site is located in the County of Imperial. Noise regulations are addressed through the efforts of various federal, state, and local government agencies. The agencies responsible for regulating noise are discussed below.

4.1 Federal Regulations

The adverse impact of noise was officially recognized by the federal government in the Noise Control Act of 1972, which serves three purposes:

- Promulgating noise emission standards for interstate commerce
- Assisting state and local abatement efforts
- Promoting noise education and research

The Federal Office of Noise Abatement and Control (ONAC) was initially tasked with implementing the Noise Control Act. However, the ONAC has since been eliminated, leaving the development of federal noise policies and programs to other federal agencies and interagency committees. For example, the Occupational Safety and Health Administration (OSHA) agency prohibits exposure of workers to excessive sound levels. The Department of Transportation (DOT) assumed a significant role in noise control through its various operating agencies. The Federal Aviation Administration (FAA) regulates noise of aircraft and airports. Surface transportation system noise is regulated by a host of agencies, including the Federal Transit Administration (FTA). Transit noise is regulated by the federal Urban Mass Transit Administration (UMTA), while freeways that are part of the interstate highway system are regulated by the Federal Highway Administration (FHWA). Finally, the federal government actively advocates that local jurisdictions use their land use regulatory authority to arrange new development in such a way that "noise sensitive" uses are either prohibited from being sited adjacent to a highway or, alternately that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

Although the proposed project is not under the jurisdiction of the FTA, the FTA is the only agency that has defined what constitutes a significant noise impact from implementing a project. The FTA standards are based on extensive studies by the FTA and other governmental agencies on the human effects and reaction to noise and a summary of the FTA findings are provided below in Table A.

Table A – FTA Project Effects on Cumulative Noise Exposure

Existing Noise Exposure	Allowable Noise Impact Exposure dBA Leq or Ldn					
(dBA Leq or Ldn)	Project Only	Combined	Noise Exposure Increase			
45	51	52	+7			
50	53	55	+5			
55	55	58	+3			
60	57	62	+2			
65	60	66	+1			
70	64	71	+1			
75	65	75	0			

Source: Federal Transit Administration, 2018.

Since the federal government has preempted the setting of standards for noise levels that can be emitted by transportation sources, the City is restricted to regulating noise generated by the transportation system through nuisance abatement ordinances and land use planning.

4.2 State Regulations

Noise Standards

California Department of Health Services Office of Noise Control

Established in 1973, the California Department of Health Services Office of Noise Control (ONC) was instrumental in developing regularity tools to control and abate noise for use by local agencies. One significant model is the "Land Use Compatibility for Community Noise Environments Matrix," which allows the local jurisdiction to clearly delineate compatibility of sensitive uses with various incremental levels of noise.

California Noise Insulation Standards

Title 24, Chapter 1, Article 4 of the California Administrative Code (California Noise Insulation Standards) requires noise insulation in new hotels, motels, apartment houses, and dwellings (other than single-family detached housing) that provides an annual average noise level of no more than 45 dBA CNEL. When such structures are located within a 60-dBA CNEL (or greater) noise contour, an acoustical analysis is required to ensure that interior levels do not exceed the 45-dBA CNEL annual threshold. In addition, Title 21, Chapter 6, Article 1 of the California Administrative Code requires that all habitable rooms, hospitals, convalescent homes, and places of worship shall have an interior CNEL of 45 dB or less due to aircraft noise.

Government Code Section 65302

Government Code Section 65302 mandates that the legislative body of each county and city in California adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable.

Vibration Standards

Title 14 of the California Administrative Code Section 15000 requires that all state and local agencies implement the California Environmental Quality Act (CEQA) Guidelines, which requires the analysis of exposure of persons to excessive groundborne vibration. However, no statute has been adopted by the state that quantifies the level at which excessive groundborne vibration occurs.

Caltrans issued the *Transportation- and Construction-Induced Vibration Guidance Manual* in 2004. The manual provides practical guidance to Caltrans engineers, planners, and consultants who must address vibration issues associated with the construction, operation, and maintenance of Caltrans projects. However, this manual is also used as a reference point by many lead agencies and CEQA practitioners throughout California, as it provides numeric thresholds for vibration impacts. Thresholds are established for continuous (construction-related) and transient (transportation-related) sources of vibration, which found that the human response becomes distinctly perceptible at 0.25 inch per second PPV for transient sources and 0.04 inch per second PPV for continuous sources.

4.3 Local Regulations

The County of Imperial General Plan and Municipal Code establishes the following applicable policies related to noise and vibration.

County of Imperial General Plan Noise Element

The General Plan Noise Element provides the following noise standards:

1. Interior Noise Standards

The California Noise Insulation Standards, California Code of Regulations Title 24, establishes a maximum interior noise level, with windows closed, of 45 dB CNEL, due to exterior sources. This requirement is applicable to new hotels, motels, apartment houses and dwellings other than detached single-family dwellings.

The County of Imperial hereby establishes the following additional interior noise standards to be considered in acoustical analyses.

- The interior noise standard for detached single family dwellings shall be 45 dB CNEL.
- The interior noise standard for schools, libraries, offices and other noise sensitive areas where the
 occupancy is normally only in the day time, shall be 50 dB averaged over a one-hour period
 (Leq(1)).

2. Property Line Noise Standards

The Property Line Noise Limits listed in Table 9 shall apply to noise generation from one property to an adjacent property. The standards imply the existence of a sensitive receptor on the adjacent, or receiving, property. In the absence of a sensitive receptor, an exception or variance to the standards may be appropriate. These standards do not apply to construction noise.

These standards are intended to be enforced through the County's code enforcement program on the basis of complaints received from persons impacted by excessive noise. It must be acknowledged that a noise nuisance may occur even though an objective measurement with a sound level meter is not available. In such cases, the County may act to restrict disturbing, excessive, or offensive noise which causes discomfort or annoyance to reasonable persons of normal sensitivity residing in an area.

Table B – County of Imperial Property Line Noise Limits

Zone	Time	Applicable Limit One-hour Average Sound Level (Decibels)
Residential Zones	7 a.m. to 10 p.m.	50
Residential Zones	10 p.m. to 7 a.m.	45
Multi-Residential Zones	7 a.m. to 10 p.m.	55
Widiti-Residential Zones	10 p.m. to 7 a.m.	50
Communical Zorosa	7 a.m. to 10 p.m.	60
Commercial Zones	10 p.m. to 7 a.m.	55
Light Industrial/Industrial Park Zones	Anytime	70
General Industrial Zones	Anytime	75

Note: When the noise-generating property and the receiving property have different uses, the more restrictive standard shall apply. When the ambient noise level is equal to or exceeds the Property Line noise standard, the increase of the existing or proposed noise shall not exceed 3 dB Lea

Source: County of Imperial, 2015.

3. Construction Noise Standards

Construction noise, from a single piece of equipment or a combination of equipment, shall not exceed 75 dB Leq, when averaged over an eight (8) hour period, and measured at the nearest sensitive receptor. This standard assumes a construction period, relative to an individual sensitive receptor of days or weeks. In cases of extended length construction times, the standard may be tightened so as not to exceed 75 dB Leq when averaged over a one (1) hour period.

Construction equipment operation shall be limited to the hours of 7 a.m. to 7 p.m., Monday through Friday, and 9 a.m. to 5 p.m. Saturday. No commercial construction operations are permitted on Sunday or holidays. In cases of a person constructing or modifying a residence for himself/herself, and if the work is not being performed as a business, construction equipment operations may be performed on Sundays and holidays between the hours of 9 a.m. and 5 p.m. Such non-commercial construction activities may be further restricted where disturbing, excessive, or offensive noise causes discomfort or annoyance to reasonable persons of normal sensitivity residing in an area.

4. Significant Increase of Ambient Noise Levels

The increase of noise levels generally results in an adverse impact to the noise environment. The Noise/Land Use Compatibility Guidelines are not intended to allow the increase of ambient noise levels up to the maximum without consideration of feasible noise reduction measures. The following guidelines are established by the County of Imperial for the evaluation of significant noise impact.

- a. If the future noise level after the project is completed will be within the "normally acceptable" noise levels shown in the Noise/Land Use Compatibility Guidelines, but will result in an increase of 5 dB CNEL or greater, the project will have a potentially significant noise impact and mitigation measures must be considered.
- b. If the future noise level after the project is completed will be greater than the "normally acceptable" noise levels shown in the Noise/Land Use Compatibility Guidelines, a noise increase of 3 dB CNEL or greater shall be considered a potentially significant noise impact and mitigation measures must be considered.

The following applicable goals, objectives, and policies to the proposed project are from the Noise Element of the General Plan.

- **Goal 1:** Provide an acceptable noise environment for existing and future residents in Imperial County.
- **Objective 1.3** Control noise levels at the source where feasible.
- **Objective 1.4** Coordinate with airport operators to ensure operations are in conformance with approved Airport Land Use Compatibility Plans
- **Goal 2:** Review proposed projects for noise impacts and require design which will provide acceptable indoor and outdoor noise environments.
- **Objective 2.3** Work with project proponents to utilize site planning, architectural design, construction, and noise barriers to reduce noise impacts as projects as proposed.

Policy 1: Acoustical Analysis of Proposed Projects

The County shall require the analysis of proposed discretionary projects which may generate excessive noise or which may be impacted by existing excessive noise levels, including but not limited to the following:

- An analysis shall be required for any project which would be located, all or in part, in a Noise Impact Zone as specified above.
- An analysis shall be required for any project which has the potential to generate noise in excess of the Property Line Noise Limits stated in Table 9 (see Table B).
- An analysis shall be required for any project which, although not located in a Noise Impact Zone, has the potential to result in a significant increase in noise levels to sensitive receptors in the community.

An acoustical analysis and report shall be prepared by a person deemed qualified by the Director of Planning. The report shall describe the existing noise environment, the proposed project, the projected noise impact and, if required, the proposed mitigation to ensure conformance with applicable standards.

County of Imperial Municipal Code

The County of Imperial Municipal Code establishes the following applicable standards related to noise.

90702.00 - Sound level limits

A. It is unlawful for any person to cause noise by any means to the extent that the applicable one-hour average sound level set out in the following table (see Table C) is exceeded, at any location in the county of Imperial on or beyond the boundaries of the property on which the noise is produced.

Table C – County of Imperial Municipal Code Sound Level Limits

Land Use Zone	Time of Day	One Hour Average Sound Level (decibels)
1. Residential:	7 a.m. to 10 p.m.	50
All R-1	10 p.m. to 7 a.m.	45
2. Residential:	7 a.m. to 10 p.m.	55
All R-2	10 p.m. to 7 a.m.	50
3. Residential:	7 a.m. to 10 p.m.	55
R-3, R-4 & all Other Residential	10 p.m. to 7 a.m.	50
4. All commercial	7 a.m. to 10 p.m.	60
4. All commercial	10 p.m. to 7 a.m.	55
5. Manufacturing, all other industrial, including agricultural & extraction industry	Anytime	70
6. General industrial	Anytime	75

Source: County of Imperial, 2015.

- B. The sound level limit between two zoning districts (different land uses) shall be measured at the property line between the properties.
- **C.** Fixed-location public utility distribution or transmission facilities located on or adjacent to a property line shall be subject to the noise level limits of subsection A of this section, measured at or beyond six feet from the boundary of the easement upon which the equipment is located.

5.0 EXISTING NOISE CONDITIONS

To determine the existing noise levels, noise measurements have been taken in the vicinity of the project site. The field survey noted that noise within the proposed project area is generally characterized by vehicle traffic on Best Avenue, which is located adjacent to the east side of the project site as well as train noise from the UPRR that runs through the western portion of the project site. The following describes the measurement procedures, measurement locations, noise measurement results, and the modeling of the existing noise environment.

5.1 Noise Measurement Equipment

The noise measurements were taken using three Larson Davis Model LXT1 Type 1 sound level meters programmed in "slow" mode to record the sound pressure level at 1-second intervals for 24 hours in "A" weighted form. In addition, the L_{eq} averaged over the entire measuring time and L_{max} were recorded with both sound level meters. The sound level meters and microphones were mounted on fences and power poles on the project site, in the vicinity of the nearby homes. The noise meters were mounted on fences and poles that were placed between four and six feet above the ground and were equipped with windscreens during all measurements. The noise meters were calibrated before and after the monitoring using a Larson Davis Cal200 calibrator. All noise level measurement equipment meets American National Standards Institute specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA).

Noise Measurement Locations

The noise monitoring locations were selected in order to obtain the existing noise levels on the project site, in the vicinity of the nearby homes. Descriptions of the noise monitoring sites are provided below in Table D and are shown in Figure 3. Appendix A includes a photo index of the study area and noise level measurement locations.

Noise Measurement Timing and Climate

The noise measurements were recorded between 12:48 p.m. on Thursday, April, 22, 2021 and 1:09 p.m. on Friday, April 23, 2021. At the start of the noise measurements, the sky was clear (no clouds), the temperature was 80 degrees Fahrenheit, the humidity was 45 percent, barometric pressure was 29.89 inches of mercury, and the wind was blowing around four miles per hour. Overnight, the temperature dropped to 53 degrees Fahrenheit. At the conclusion of the noise measurements, the sky was hazy, the temperature was 82 degrees Fahrenheit, the humidity was 23 percent, barometric pressure was 29.99 inches of mercury, and the wind was blowing around seven miles per hour.

5.2 Noise Measurement Results

The results of the noise level measurements are presented in Table D. The measured sound pressure levels in dBA have been used to calculate the minimum and maximum L_{eq} averaged over 1-hour intervals. Table D also shows the L_{eq} , L_{max} , and CNEL, based on the entire measurement time. The noise monitoring data printouts are included in Appendix B. Figure 4 shows a graph of the 24-hour noise measurements.

Table D – Existing (Ambient) Noise Level Measurements

Site		Average	e (dBA L _{eq})	1-hr Average	(dBA L _{eq} /Time)	Average
No.	Site Description	Daytime ¹	Nighttime ²	Minimum	Maximum	(dBA CNEL)
	Located near the southeast corner of the					_
1	project site, on a power pole,	62.0	56.2	48.6	63.7	64.8
1	approximately 55 feet west of Best	62.0	30.2	11:23 p.m.	5:49 a.m.	04.8
	Avenue centerline.					
	Located near the northeast corner of the					
2	project site, on a power pole,	60.2	55.6	45.9	63.1	63.9
2	approximately 60 feet west of Best	00.2		11:26 p.m.	5:50 a.m.	03.9
	Avenue centerline.					
	Located near the northwest corner of the			36.1	76.0	
3	project site, on a fence, approximately	66.5	64.9			73.3
	115 feet west of the BNSF Railroad.			3:42 a.m.	9:16 p.m.	

Notes:

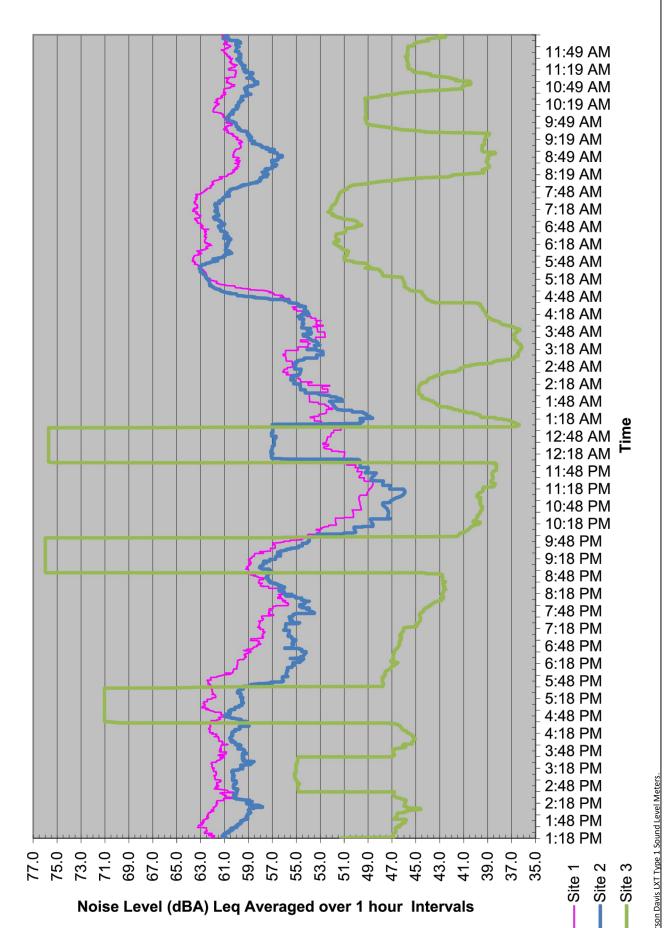
Source: Noise measurements taken between Thursday, April 22 and Friday, April 23, 2021.

¹ Daytime is defined as 7:00 a.m. to 10:00 p.m. (Section 90702.00(A) of the Municipal Code)

 $^{^{\}rm 2}$ Nighttime define as 10:00 p.m. to 7:00 a.m. (Section 90702.00(A) of the Municipal Code)









6.0 MODELING PARAMETERS AND ASSUMPTIONS

6.1 Construction Noise

The noise impacts from construction of the proposed project have been analyzed through use of the FHWA's Roadway Construction Noise Model (RCNM). The FHWA compiled noise measurement data regarding the noise generating characteristics of several different types of construction equipment used during the Central Artery/Tunnel project in Boston. Table E below provides a list of the construction equipment anticipated to be used for each phase of construction as detailed in *Air Quality, Energy, and Greenhouse Gas Emissions Impact Analysis Brawley Solar Energy Facility Project* (Air Quality Analysis), prepared by Vista Environmental, May 13, 2021.

Table E – Construction Equipment Noise Emissions and Usage Factors

Equipment Description	Number of Equipment	Acoustical Use Factor ¹ (percent)	Spec 721.560 Lmax at 50 feet ² (dBA, slow ³)	Actual Measured Lmax at 50 feet ⁴ (dBA, slow ³)
Site Preparation				
Bore/Drill Rig	2	20	84	79
Excavators	2	40	85	81
Rubber Tired Dozers	3	40	85	83
Tractors/Loaders/Backhoes	4	40	84	N/A
PV System Installation and Te	sting			
Aerial Lifts (Man Lift)	2	40	84	N/A
Air Compressor	1	40	80	78
Cranes	2	16	85	81
Forklifts (Gradall)	3	40	85	83
Generator Set	1	50	82	81
Graders	1	40	85	N/A
Off-Hwy Trucks (Flat Bed Truck)	2	40	84	74
Tractors/Loaders/Backhoes	3	40	84	N/A
Welders	1	40	73	74
Site Cleanup and Restoration				
Graders	2	40	85	N/A
Rubber Tired Dozers	2	40	85	83
Front End Loaders	2	40	80	79
Tractors/Loaders/Backhoes	2	40	84	N/A

Notes:

Source: Federal Highway Administration, 2006 and CalEEMod default equipment mix.

Table E also shows the associated measured noise emissions for each piece of equipment from the RCNM model and measured percentage of typical equipment use per day. Construction noise impacts to the nearby homes have been calculated according to the equipment noise levels and usage factors listed in

¹ Acoustical use factor is the percentage of time each piece of equipment is operational during a typical workday.

² Spec 721.560 is the equipment noise level utilized by the RCNM program.

³ The "slow" response averages sound levels over 1-second increments. A "fast" response averages sound levels over 0.125-second increments.

⁴ Actual Measured is the average noise level measured of each piece of equipment during the Central Artery/Tunnel project in Boston, Massachusetts primarily during the 1990s.

Table E and through use of the RCNM. For each phase of construction, all construction equipment was analyzed based on being placed in the middle of the project site, which is based on the analysis methodology detailed in FTA Manual for a General Assessment. However, in order to provide a conservative analysis, all equipment was analyzed, instead of just the two nosiest pieces of equipment as detailed in the FTA Manual.

6.2 Vibration

Construction activity can result in varying degrees of ground vibration, depending on the equipment used on the site. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings in the vicinity of the project site respond to these vibrations with varying results ranging from no perceptible effects at the low levels to slight damage to the structures at the highest levels. Table F gives approximate vibration levels for particular construction equipment that is provided by the FTA, however it should be noted that not all of these equipment types would be used during construction of the proposed project. The data in Table F provides a reasonable estimate for a wide range of soil conditions.

Table F - Vibration Source Levels for Construction Equipment

Equipment		Peak Particle Velocity (inches/second)	Approximate Vibration Level (L _v)at 25 feet
Pile driver (impact)	Upper range	1.518	112
The driver (impact)	typical	0.644	104
Pile driver (sonic)	Upper range	0.734	105
Pile driver (soriic)	typical	0.170	93
Clam shovel drop (slurry wall)		0.202	94
Vibratory Roller		0.210	94
Hoe Ram		0.089	87
Large bulldozer		0.089	87
Caisson drill		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

Source: Federal Transit Administration, 2018.

The construction-related vibration impacts have been calculated through the vibration levels shown above in Table F and through typical vibration propagation rates. The equipment assumptions were based on the equipment lists provided above in Table E.

7.0 IMPACT ANALYSIS

7.1 CEQA Thresholds of Significance

Consistent with the California Environmental Quality Act (CEQA) and the State CEQA Guidelines, a significant impact related to noise would occur if a proposed project is determined to 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;
- Generation of excessive groundborne vibration or groundborne noise levels; or
- 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.

7.2 Generation of Noise Levels in Excess of Standards

The proposed project would not generate 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. The following section calculates the potential noise emissions associated with the temporary construction activities and long-term operations of the proposed project and compares the noise levels to the City standards.

Construction-Related Noise

The construction activities for the proposed project are anticipated to include: 1) Site Preparation; 2) PV System Installation and Testing, and 3) Site Clean-up and Restoration. Noise impacts from construction activities associated with the proposed project would be a function of the noise generated by construction equipment, equipment location, sensitivity of nearby land uses, and the timing and duration of the construction activities. The nearest sensitive receptors to the project site are single-family homes located as near as 40 feet to the north side of the project site (near the northwest corner of the project site). There are also homes located on the east side of Best Avenue that are as near as 120 feet east of the project site

The General Plan Noise Element includes Construction Noise Standards that limits the noise created from construction equipment to 75 dB Leq, averaged over an eight (8) hour period at the nearest sensitive receptor. In addition, the Construction Noise Standards limit construction equipment operation to between the hours of 7 a.m. to 7 p.m., Monday through Friday, and 9 a.m. to 5 p.m. Saturday. No commercial construction operations are permitted on Sunday or holidays.

Construction noise impacts to the nearby sensitive receptors have been calculated through use of the RCNM and the parameters and assumptions detailed in Section 6.1 of this report including Table E – Construction Equipment Noise Emissions and Usage Factors. For each phase of construction, all construction equipment was analyzed based on being placed in the middle of the project site, which is based on the analysis methodology detailed in FTA Manual for a General Assessment. Since the County's construction noise standard is based on the noise level over an 8-hour period and in a typical day the proposed construction equipment would operate over the entire project site, the use of the methodology detailed in the FTA Manual for a General Assessment would provide a reasonable estimate of the

construction-related noise levels created by the proposed project. The results are shown below in Table G and the RCNM printouts are provided in Appendix D.

Table G – Construction Noise Levels at the Nearby Homes

	Construction Noise Level (dBA Leq) at:					
Construction Phase	Home to Northwest ¹	Home to Northeast ²	Home to Southeast ³			
Site Preparation	52	52	52			
PV System Installation and Testing	53	53	53			
Site Clean-Up and Restoration	52	52	52			
Construction Noise Threshold ⁴	75	75	75			
Ambient Daytime Noise Level	66.5	60.2	62.0			
Exceed Thresholds?	No	No	No			

 $^{^{1}}$ The distance from the center of the project site to the home to the northwest was measured at 2,900 feet.

Source: RCNM, Federal Highway Administration, 2006

Table G shows that greatest construction noise impacts would be as high as 53 dBA Leq during the PV system installation and testing phase at the nearest homes to the northwest, northeast, and southeast of the project site. All calculated construction noise levels shown in Table G are within the City's construction noise standard of 75 dBA and would also be below the existing ambient daytime noise levels in the vicinity of the nearby homes. Therefore, through adherence to the limitation of allowable construction times provided in the General Plan Noise Element, construction-related noise levels would not exceed any standards established in the General Plan or Noise Ordinance nor would construction activities create a substantial temporary increase in ambient noise levels from construction of the proposed project. Impacts would be less than significant.

Operational-Related Noise

The proposed project would consist of the development of a solar facility with a BESS and a substation. Since the proposed project would be operated on an unstaffed basis and monitored remotely from the Brawley Geothermal Power Plant control room, operation of the proposed project would not typically generate any additional vehicle traffic on the nearby roadways. As such, potential noise impacts associated with the operations of the proposed project would be limited to onsite noise sources. The proposed PV solar panels do not create any operational noise, however the proposed BESS Enclosures (AC Unit noise), Power Conversion System (PCS), Power Distribution Center (PDC) that would be located at the BESS, and auxiliary transformers, and Battery Step Up Transformer that would be located at the proposed substation are known sources of noise that have been analyzed below.

Both the General Plan Noise Element and Section 90702.00 provide the same noise level limits at the property line of the nearby homes of 50 dBA Leq-1hour between 7 a.m. and 10 p.m. and 45 dBA Leq-1hour between 10 p.m. and 7 a.m.. When the ambient noise level is equal to or exceeds the above noise standards, the proposed noise source shall not exceed the ambient plus 3 dB Leq.

In order to determine the noise impacts from the operation of onsite noise making equipment, noise specifications from previously prepared noise reports were obtained and are shown in Table H. The noise levels from each source were calculated through use of standard geometric spreading of noise from a

² The distance from the center of the project site to the homes to the northeast was measured at 2,900 feet.

³ The distance from the center of the project site to the home to the southeast was measured at 2,850 feet.

 $^{^{4}}$ Construction Noise Threshold obtained from the General Plan Noise Element (County of Imperial, 2015).

point source with a drop-off rate of 6 dB for each doubling of the distance between the source and receiver.

Table H – Operational Noise Levels at the Nearby Homes

	Home to N	to Northwest Home to Northeast		lortheast	Home to S	outheast
	Distance -	Noise	Distance -	Noise	Distance -	Noise
	Source to	Level ¹	Source to	Level ¹	Source to	Level ¹
Noise Source	Home (feet)	(dBA Leq)	Home (feet)	(dBA Leq)	Home (feet)	(dBA Leq)
BESS Enclosures ²	5,050	25	5,100	25	850	40
Power Conversion System ³	5,050	22	5,100	22	850	38
Power Distribution Center ⁴	5,050	22	5,100	22	850	38
Auxiliary Transformers ⁵	5,030	31	5,280	31	1,150	44
Battery Step up Transformer ⁶	5,030	31	5,280	31	850	47
Combined Noise Levels		35		35		50
County Noise Standard ⁷ (day/night)		69.5/67.9		63.2/58.6		65.0/59.2
Exceed County Noise Standards?		No/No		No/No		No/No

Notes:

Table H shows that the proposed project's onsite operational noise from the anticipated onsite noise sources would not exceed the applicable noise standards at the nearby homes. Therefore, operational onsite noise impacts would be less than significant

Level of Significance

Less than significant impact.

7.3 Generation of Excessive Groundborne Vibration

The proposed project would not expose persons to or generation of excessive groundborne vibration or groundborne noise levels. The following section analyzes the potential vibration impacts associated with the construction and operations of the proposed project.

Construction-Related Vibration Impacts

The construction activities for the proposed project are anticipated to include: 1) Site Preparation; 2) PV System Installation and Testing, and 3) Site Clean-up and Restoration. Vibration impacts from construction activities associated with the proposed project would typically be created from the operation of heavy off-road equipment. The nearest sensitive receptor to the project site is a single-family home located as near as 40 feet to the north side of the project site (near the northwest corner of the project site).

¹ The noise levels were calculated through use of standard geometric spreading of noise from a point source with a drop-off rate of 6 dB for each doubling of the distance between the source and receiver.

 $^{^{\}rm 2}\,$ BESS Enclosures is based on a reference noise measurement of 88.6 dBA at 1 meter.

 $^{^{\}rm 3}\,$ Power Conversion System is based on a reference noise measurement of 86.1 dBA at 1 meter.

 $^{^{}m 4}$ Power Distribution Center is based on a reference noise measurement of 86.1 dBA at 1 meter.

 $^{^{\}rm 5}$ Auxiliary Transformers are based on a reference noise measurement of 95.1 dBA at 1 meter.

⁶ Battery Step up Transformer is based on a reference noise measurement of 95.1 dBA at 1 meter.

⁷ County Noise Standard based on ambient noise level shown in Table D plus 3 dB at the nearby homes.

Since neither the Municipal Code nor the General Plan provides any thresholds related to vibration, Caltrans guidance that is detailed above in Section 4.2 has been utilized, which defines the threshold of perception from transient sources at 0.25 inch per second PPV.

The primary source of vibration during construction would be from the operation of a bulldozer. From Table F above a large bulldozer would create a vibration level of 0.089 inch per second PPV at 25 feet. Based on typical propagation rates, the vibration level at the nearest home (40 feet away) would be 0.06 inch per second PPV. The vibration level at the nearest home, would be below the 0.25 inch per second PPV threshold detailed above. Impacts would be less than significant.

Operations-Related Vibration Impacts

The proposed project would consist of the operation of a solar energy facility. The on-going operation of the proposed project would not include the operation of any known vibration sources. Therefore, a less than significant vibration impact is anticipated from the operation of the proposed project.

Level of Significance

Less than significant impact.

7.4 Aircraft Noise

The proposed project would not expose people residing or working in the project area to excessive noise levels from aircraft. The nearest airport is Brawley Municipal Airport that is located as near as 1.5 mile south of the project site. The project site is located outside of the 60 dBA CNEL noise contours of Brawley Municipal Airport and no sensitive receptors would be introduced to the project site through implementation of the proposed project. No impact would occur from aircraft noise.

Level of Significance

No impact would occur.

8.0 REFERENCES

California Department of Transportation, 2016 Annual Average Daily Truck Traffic on the California State Highway System, 2018.

California Department of Transportation (Caltrans), *Technical Noise Supplement to the Traffic Noise Analytics Protocol*, September 2013.

California Department of Transportation, *Transportation- and Construction-Induced Vibration Guidance Manual*, September 2013.

County of Imperial, Noise Element County of Imperial General Plan, October 6, 2015.

County of Imperial, County of Imperial, California Codified Ordinances, 2020.

Federal Transit Administration, Transit Noise and Vibration Impact Assessment, September 2018.

U.S. Department of Transportation, FHWA Roadway Construction Noise Model User's Guide, January, 2006.

Vista Environmental, Air Quality, Energy, and Greenhouse Gas Emissions Impact Analysis Brawley Solar Energy Facility Project, May 13, 2021.

APPENDIX A

Field Noise Measurements Photo Index



Noise Measurement Site 1 - looking north



Noise Measurement Site 1 - looking northeast



Noise Measurement Site 1 - looking east



Noise Measurement Site 1 - looking southeast



Noise Measurement Site 1 - looking south



Noise Measurement Site 1 - looking southwest



Noise Measurement Site 1 - looking west



Noise Measurement Site 1 - looking northwest



Noise Measurement Site 2 - looking north



Noise Measurement Site 2 - looking northeast



Noise Measurement Site 2 - looking east



Noise Measurement Site 2 - looking southeast



Noise Measurement Site 2 - looking south



Noise Measurement Site 2 - looking southwest



Noise Measurement Site 2 - looking west



Noise Measurement Site 2 - looking northwest



Noise Measurement Site 3 - looking north



Noise Measurement Site 3 - looking northeast



Noise Measurement Site 3 - looking east



Noise Measurement Site 3 - looking southeast



Noise Measurement Site 3 - looking south



Noise Measurement Site 3 - looking southwest



Noise Measurement Site 3 - looking west



Noise Measurement Site 3 - looking northwest

APPENDIX B

Field Noise Measurements Printouts

Site 1 - Near Southeast Corner of Project Site April 22, 2021 12:48:22 PM ampling Time = 1 si Freq Weighting=A

Record Num = 86402 Leq = 59.9

Leq Daytime = 62.0 Leq Nighttime = 56.2

CNEL(24hr)= 64.8 Ldn(24hr)= 64.6

Site 2 - Near Northeast Corner of Project Site

April 22, 2021 1:09:16 PM impling Time = 1 si Freq Weighting=A

April 22, 2021 1:02:45 PM npling Time = 1 scFreq Weighting=A Leq Daytime = 60.2 Leq Nighttime = 55.6

CNEL(24hr)= 63.9 Ldn(24hr)= 63.7 Record Num = 86402

Leg = 65.8

Site 3 - Near Northwest Corner of Project Site

Leq Daytime = 66.5 Leq Nighttime = 64.9

CNEL(24hr)= 73.3 Ldn(24hr)= 72.5

Record Num = 86402 Leq = 58.5 Min = 39.6 Max = 84.6 Min Leq hr at 11:23 PM 48.6 Max Leq hr at 5:49 AM 63.7 Min Leq hr at 11:26 PM 45.9 Max Leq hr at 5:50 AM 63.1 Min = 30.8 Max = 106.8 Min Leq hr at 3:42 AM 36.1 Max Leq hr at 9:16 PM 76.0 Min = 39.5 Max = 85.7 Site 3 - Near Northwest Corner of Project Site 1 - Near Northwest Corner of Project Site 1 - Site 3 - Site 1 - Near Southeast Corner of Project Site Times

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Ti SPL Ldn CNEL Leq (1 hour Avg.) Ldn CNEI Ldn CNEL 577.77 57

SPL	Time	Southeast Corner of Project Leq (1 hour Avg.)	Ldn CNE		Time	Northeast Corner of Pro Leq (1 hour Avg.)	Ldn CNEI	SPL	Time	ear Northwest Corner of Project S Leq (1 hour Avg.)	Site Ldn C	
50.9 50.2 53.5 53.5	12:51:12 12:51:13 12:51:14 12:51:15		50.2 5 53.5 5 53.5 5	0.9 55.0 0.2 54.7 3.5 55.9 3.5 55.4	13:05:35 13:05:36 13:05:37 13:05:38		55.0 56 54.7 54 55.9 56 55.4 56	1.7 38.4 5.9 38.2 5.4 37.4	13:12:06 13:12:07 13:12:08 13:12:09		38.5 38.4 38.2 37.4	38.5 38.4 38.2 37.4
50.5 49.5 49.3 49.7	12:51:16 12:51:17 12:51:18 12:51:19		49.5 4 49.3 4 49.7 4	0.5 54.8 9.5 54.7 9.3 55.1 9.7 54.6	13:05:39 13:05:40 13:05:41 13:05:42		54.8 54 54.7 54 55.1 55 54.6 54	1.7 37.6 5.1 38.0 1.6 38.2	13:12:10 13:12:11 13:12:12 13:12:13		37.5 37.6 38.0 38.2	37.5 37.6 38.0 38.2
52.9 53.9 53.1 52.0	12:51:20 12:51:21 12:51:22 12:51:23		53.9 5 53.1 5 52.0 5	2.9 54.8 3.9 54.1 3.1 54.5 2.0 54.7	13:05:43 13:05:44 13:05:45 13:05:46		54.8 54 54.1 54 54.5 54 54.7 54	1.1 38.4 1.5 38.1 1.7 38.0	13:12:14 13:12:15 13:12:16 13:12:17		38.2 38.4 38.1 38.0	38.2 38.4 38.1 38.0
50.9 48.8 46.9 45.7	12:51:24 12:51:25 12:51:26 12:51:27		50.9 5 48.8 4 46.9 4	0.9 55.2 8.8 55.8 6.9 62.0 5.7 69.1	13:05:47 13:05:48 13:05:49 13:05:50		55.2 55 55.8 55 62.0 62	5.2 39.0 5.8 39.0 2.0 39.6	13:12:18 13:12:19 13:12:20 13:12:21		39.0 39.0 39.6 40.1	39.0 39.0 39.6 40.1
45.1 47.3 48.5 49.3	12:51:28 12:51:29 12:51:30 12:51:31		45.1 4 47.3 4 48.5 4	5.1 71.4 7.3 68.9 8.5 65.3 9.3 62.2	13:05:51 13:05:52 13:05:53 13:05:54		71.4 7 68.9 68 65.3 68	1.4 39.6 3.9 39.0 5.3 38.2	13:12:22 13:12:23 13:12:24 13:12:25		39.6 39.0 38.2	39.6 39.0 38.2
51.0 54.7 53.8	12:51:32 12:51:33 12:51:34		51.0 5 54.7 5 53.8 5	1.0 59.1 4.7 57.0 3.8 56.3	13:05:55 13:05:56 13:05:57		62.2 63 59.1 59 57.0 57 56.3 56	9.1 37.7 7.0 37.7 3.3 37.3	13:12:26 13:12:27 13:12:28		38.3 37.7 37.7 37.3	38.3 37.7 37.7 37.3
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SPL	Site 1 - Near Southeast Corner of P Time Leq (1 hour Avg.)	Project Site	Site 2 - Near	Northeast Corner of Pr Leq (1 hour Avg.)	oject Site Ldn CNEL	Si SPL	ite 3 - N Time	lear Northwest Corner of Project Leq (1 hour Avg.)	Site Ldn C	NEI
49.1 48.6	13:03:50 13:03:51	49.1 49.1 48.6 48.6	53.3 13:18:13 53.4 13:18:14	Leq (1 nour Avg.)	53.3 53.3 53.4 53.4	36.7 36.3	13:24:44	Led (1 Hour Avg.)	36.7 36.3	36.7 36.3
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42.2 41.4 41.5	13:06:20 13:06:21	42.2 42.2 41.4 41.4 41.5 41.5	58.4 13:20:42 55.6 13:20:43 53.7 13:20:44		58.4 58.4 55.6 55.6 53.7 53.7	42.1 41.7 42.4	13:27:13 13:27:14 13:27:15		42.1 41.7 42.4	42.1 41.7 42.4
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53.7	13:06:31	53.7 53.7	52.8 13:20:54		52.8 52.8	39.5	13:27:25		39.5	39.5

	Site 1 - Near Southeast Corner of Pr				Near Northeast Corner of Proje					lear Northwest Corner of Projec		
52.6 51.0	Time Leq (1 hour Avg.) 13:06:32 13:06:33	Ldn CNEL 52.6 52.6 51.0 51.0	SPL 51.9 52.2	Time 13:20:55 13:20:56	Leq (1 hour Avg.)	Ldn Cl 51.9 52.2	51.9 52.2	SPL 40.7 40.6	Time 13:27:26 13:27:27	Leq (1 hour Avg.)	Ldn C 40.7 40.6	40.7 40.6
49.5 50.7	13:06:33 13:06:34 13:06:35	51.0 51.0 49.5 49.5 50.7 50.7	52.2 52.5 53.5	13:20:56 13:20:57 13:20:58		52.2 52.5 53.5	52.2 52.5 53.5	40.6 40.1 39.7	13:27:27 13:27:28 13:27:29		40.6 40.1 39.7	40.6 40.1 39.7
50.7 50.7	13:06:36 13:06:37	50.7 50.7 50.7 50.7	53.5 54.2	13:20:59		53.5 54.2	53.5 54.2	40.5 40.9	13:27:30		40.5 40.9	40.5 40.9
48.3 46.2	13:06:38 13:06:39	48.3 48.3 46.2 46.2	56.2 58.7	13:21:01 13:21:02		56.2 58.7	56.2 58.7	39.9 39.4	13:27:32 13:27:33		39.9 39.4	39.9 39.4
46.1 46.1	13:06:40 13:06:41	46.1 46.1 46.1 46.1	65.4 69.7	13:21:03 13:21:04		65.4 69.7	65.4 69.7	39.2 38.9	13:27:34 13:27:35		39.2 38.9	39.2 38.9
46.8 46.4	13:06:42 13:06:43	46.8 46.8 46.4 46.4	69.4 66.6	13:21:05 13:21:06		69.4 66.6	69.4 66.6	38.7 42.5	13:27:36 13:27:37		38.7 42.5	38.7 42.5
45.5 44.5	13:06:44 13:06:45	45.5 45.5 44.5 44.5	70.3 78.3	13:21:07 13:21:08		70.3 78.3	70.3 78.3	60.5 61.4	13:27:38		60.5	60.5 61.4
45.6 47.2 58.1	13:06:46 13:06:47 13:06:48	45.6 45.6 47.2 47.2 58.1 58.1	76.7 73.2 69.3	13:21:09 13:21:10 13:21:11		76.7 73.2 69.3	76.7 73.2 69.3	57.2 53.0 49.1	13:27:40 13:27:41 13:27:42		57.2 53.0 49.1	57.2 53.0 49.1
61.4 69.6	13:06:49 13:06:50	61.4 61.4 69.6 69.6	65.4 61.6	13:21:12		65.4 61.6	65.4 61.6	45.8 43.1	13:27:43		45.8 43.1	45.8 43.1
72.6 70.8	13:06:51 13:06:52	72.6 72.6 70.8 70.8	58.4 56.1	13:21:14 13:21:15		58.4 56.1	58.4 56.1	41.0 40.1	13:27:45 13:27:46		41.0 40.1	41.0 40.1
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52.4 52.0 51.0	13:07:00 13:07:01	52.4 52.4 52.0 52.0 51.0 51.0	51.1 51.2	13:21:22 13:21:23 13:21:24		51.1 51.2	51.1 51.2	52.7 50.3	13:27:54 13:27:55		52.7 50.3	52.7 50.3
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48.0 46.0	13:07:06 13:07:07	48.0 48.0 46.0 46.0	51.5 50.5	13:21:29 13:21:30		51.5 50.5	51.5 50.5	48.8 48.6	13:28:00 13:28:01		48.8 48.6	48.8 48.6
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63.3	13:09:13	63.3 63.3	52.1	13:23:36		52.1	52.1	45.1	13:30:07		45.1	45.1

SPL	Site 1 - Near Southeast Corner of Project S Time Leq (1 hour Avg.)	Site Ldn CNEL	Site 2 - Near SPL Time	Northeast Corner of Pr Leq (1 hour Avg.)	oject Site Ldn CNEL	Sit SPL	te 3 - Near Northwest Corn Time Leq (1 hour A	
61.2	13:09:14	61.2 61.2	51.8 13:23:37	Led (1 nour Avg.)	51.8 51.8	45.7	13:30:08	45.7 45.7
58.8	13:09:15	58.8 58.8	51.5 13:23:38		51.5 51.5	45.2	13:30:09	45.2 45.2
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48.8	13:11:55	48.8 48.8	62.9 13:26:18		62.9 62.9	38.8	13:32:49	38.8 38.8

	Site 1 - Near Southeast Corner of				Near Northeast Corner of Pr					Near Northwest Corner of Project		
SPL 46.5	Time Leq (1 hour Avg.) 13:11:56	Ldn CNEL 46.5 46.5	SPL 59.7	Time 13:26:19	Leq (1 hour Avg.)	Ldn C 59.7	59.7	SPL 39.3	Time 13:32:50		Ldn C	39.3
45.1 44.1 43.4	13:11:57 13:11:58 13:11:59	45.1 45.1 44.1 44.1 43.4 43.4	57.2 55.2 53.8	13:26:20 13:26:21 13:26:22		57.2 55.2 53.8	57.2 55.2 53.8	40.2 38.7 38.3	13:32:51 13:32:52 13:32:53		40.2 38.7 38.3	40.2 38.7 38.3
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47.8 46.6	13:12:04 13:12:05	47.8 47.8 46.6 46.6	51.3 50.9	13:26:27 13:26:28		51.3 50.9	51.3 50.9	41.0 41.0	13:32:58 13:32:59		41.0 41.0	41.0 41.0
45.2 51.0	13:12:06 13:12:07	45.2 45.2 51.0 51.0	50.6 50.7	13:26:29 13:26:30		50.6 50.7	50.6 50.7	39.3 38.4	13:33:00 13:33:01		39.3 38.4	39.3 38.4
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09.7	13:14:37	os./ 69.7	51.4	13:29:00		51.4	51.4	45.6	13:35:31		40.6	40.6

SPL	Site 1 - Near Southeast Corner of Project S Time Leq (1 hour Avg.)	Site Ldn CNEL	Site 2 - Near SPL Time	Northeast Corner of Pro Leq (1 hour Avg.)	ject Site Ldn CNEL	Si SPL	ite 3 - N Time	lear Northwest Corner of Project S Leq (1 hour Avg.)	Site Ldn C	NEI
69.3 66.1	13:14:39	69.3 69.3 66.1 66.1	50.7 13:29:01 49.7 13:29:02	Leq (1 flour Avg.)	50.7 50.7 49.7 49.7	43.6 42.1	13:35:32 13:35:33	Leq (1 flour Avg.)	43.6 42.1	43.6 42.1
62.5 59.1	13:14:40 13:14:41	62.5 62.5 59.1 59.1	49.4 13:29:03 50.0 13:29:04		49.4 49.4 50.0 50.0	42.9 42.0	13:35:34 13:35:35		42.9 42.0	42.9 42.0
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		Southeast Corner of Proje			Northeast Corner of Pr				lear Northwest Corner of Project		
50.2 51.2	Time 13:17:20 13:17:21	Leq (1 hour Avg.)	Ldn CNEL 50.2 50.2 51.2 51.2	SPL Time 56.2 13:31:43 58.5 13:31:44	Leq (1 hour Avg.)	Ldn CNEL 56.2 56.2 58.5 58.5	SPL 42.8 41.2	Time 13:38:14 13:38:15	Leq (1 hour Avg.)	Ldn C 42.8 41.2	42.8 41.2
48.9 47.4	13:17:22 13:17:23		48.9 48.9 47.4 47.4	57.7 13:31:45 57.4 13:31:46		57.7 57.7 57.4 57.4	40.7 40.5	13:38:16 13:38:17		40.7 40.5	40.7 40.5
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60.5	13:18:52	62.2	60.5 60.5	51.4 13:33:15	61.0	51.4 51.4	44.5	13:39:46	50.7	44.5	44.5
57.3	13:18:53	62.2	57.3 57.3	52.2 13:33:16	61.0	52.2 52.2	44.8	13:39:47	50.7	44.8	44.8
54.1	13:18:54	62.2	54.1 54.1	52.4 13:33:17	61.0	52.4 52.4	46.2	13:39:48	50.7	46.2	46.2
51.6	13:18:55	62.2	51.6 51.6	52.9 13:33:18	61.0	52.9 52.9	48.0	13:39:49	50.7	48.0	48.0
49.3	13:18:56	62.2	49.3 49.3	51.5 13:33:19	61.0	51.5 51.5	47.9	13:39:50	50.7	47.9	47.9
48.3	13:18:57	62.2	48.3 48.3	51.3 13:33:20	61.0	51.3 51.3	47.9	13:39:51	50.7	47.9	47.9
48.4	13:18:58	62.2	48.4 48.4	52.0 13:33:21	61.0	52.0 52.0	47.8	13:39:52	50.7	47.8	47.8
49.6	13:18:59	62.2	49.6 49.6	52.2 13:33:22	61.0	52.2 52.2	46.7	13:39:53	50.6	46.7	46.7
46.5	13:19:00	62.2	46.5 46.5	53.2 13:33:23	61.0	53.2 53.2	44.1	13:39:54	50.6	44.1	44.1
44.6	13:19:01	62.2	44.6 44.6	53.0 13:33:24	61.0	53.0 53.0	43.3	13:39:55	50.6	43.3	43.3
47.4	13:19:02	62.1	47.4 47.4	52.2 13:33:25	61.0	52.2 52.2	44.1	13:39:56	50.6	44.1	44.1
49.6	13:19:03	62.1	49.6 49.6	52.4 13:33:26	61.0	52.4 52.4	45.4	13:39:57	50.6	45.4	45.4
47.1	13:19:04	62.1	47.1 47.1	53.5 13:33:27	61.0	53.5 53.5	46.4	13:39:58	50.6	46.4	46.4
45.1	13:19:05	62.1	45.1 45.1	52.8 13:33:28	61.0	52.8 52.8	45.0	13:39:59	50.6	45.0	45.0
43.8	13:19:06	62.1	43.8 43.8	52.6 13:33:29	61.0	52.6 52.6	44.3	13:40:00	50.6	44.3	44.3
42.7	13:19:07	62.1	42.7 42.7	53.1 13:33:30	61.0	53.1 53.1	45.2	13:40:01	50.5	45.2	45.2
41.5	13:19:08	62.1	41.5 41.5	53.8 13:33:31	61.0	53.8 53.8	43.3	13:40:02	50.5	43.3	43.3
41.4	13:19:09	62.1	41.4 41.4	54.1 13:33:32	61.0	54.1 54.1	44.6	13:40:03	50.5	44.6	44.6
43.2	13:19:10	62.1	43.2 43.2	57.6 13:33:33	61.0	57.6 57.6	42.9	13:40:04	50.5	42.9	42.9
43.9	13:19:11	62.1	43.9 43.9	56.8 13:33:34	61.0	56.8 56.8	43.1	13:40:05	50.5	43.1	43.1
42.5	13:19:12	62.1	42.5 42.5	54.8 13:33:35	61.0	54.8 54.8	41.8	13:40:06	50.5	41.8	41.8
44.4	13:19:13	62.1	44.4 44.4	54.5 13:33:36	61.0	54.5 54.5	39.8	13:40:07	50.5	39.8	39.8
48.5	13:19:14	62.1	48.5 48.5	54.4 13:33:37	61.0	54.4 54.4	39.6	13:40:08	50.5	39.6	39.6
49.4	13:19:15	62.1	49.4 49.4	53.4 13:33:38	60.9	53.4 53.4	41.3	13:40:09	50.5	41.3	41.3
48.2	13:19:16	62.1	48.2 48.2	52.3 13:33:39	60.9	52.3 52.3	41.8	13:40:10	50.5	41.8	41.8
48.5	13:19:17	62.1	48.5 48.5	51.7 13:33:40	60.9	51.7 51.7	41.4	13:40:11	50.5	41.4	41.4
47.5	13:19:18	62.1	47.5 47.5	51.9 13:33:41	60.9	51.9 51.9	40.8	13:40:12	50.5	40.8	40.8
46.6	13:19:19	62.1	46.6 46.6	54.8 13:33:42	60.9	54.8 54.8	40.8	13:40:13	50.2	40.8	40.8
46.9	13:19:20	62.1	46.9 46.9	53.8 13:33:43	60.9	53.8 53.8	40.9	13:40:14	49.6	40.9	40.9
47.2	13:19:21	62.1	47.2 47.2	52.2 13:33:44	60.9	52.2 52.2	48.6	13:40:15	49.4	48.6	48.6
48.9	13:19:22	62.1	48.9 48.9	51.8 13:33:45	60.9	51.8 51.8	46.6	13:40:16	49.3	46.6	46.6
48.1	13:19:23	62.1	48.1 48.1	52.7 13:33:46	60.9	52.7 52.7	45.0	13:40:17	49.3	45.0	45.0
47.4	13:19:24	62.1	47.4 47.4	52.1 13:33:47	60.9	52.1 52.1	45.5	13:40:18	49.3	45.5	45.5
48.0	13:19:25	62.1	48.0 48.0	51.2 13:33:48	60.9	51.2 51.2	46.0	13:40:19	49.3	46.0	46.0
49.7	13:19:26	62.1	49.7 49.7	51.1 13:33:49	60.9	51.1 51.1	45.4	13:40:20	49.3	45.4	45.4
50.3	13:19:27	62.1	50.3 50.3	51.2 13:33:50	60.9	51.2 51.2	46.8	13:40:21	49.2	46.8	46.8
50.1	13:19:28	62.1	50.1 50.1	51.9 13:33:51	60.9	51.9 51.9	46.4	13:40:22	49.2	46.4	46.4
50.5	13:19:29	62.1	50.5 50.5	52.7 13:33:52	60.9	52.7 52.7	45.7	13:40:23	49.2	45.7	45.7
50.5 50.6 50.1	13:19:29 13:19:30 13:19:31	62.1 62.1	50.5 50.5 50.6 50.6 50.1 50.1	53.0 13:33:53 52.7 13:33:54	60.9 60.9	53.0 53.0 52.7 52.7	45.7 44.7 45.0	13:40:24 13:40:25	49.1 48.5	44.7 45.0	44.7 45.0
50.0	13:19:32	62.1	50.0 50.0	52.2 13:33:55	60.9	52.2 52.2	46.6	13:40:26	48.3	46.6	46.6
49.6	13:19:33	62.1	49.6 49.6	53.2 13:33:56	60.9	53.2 53.2	47.7	13:40:27	48.2	47.7	47.7
50.6	13:19:34	62.1	50.6 50.6	53.0 13:33:57	60.9	53.0 53.0	46.6	13:40:28	48.2	46.6	46.6
51.0	13:19:35	62.1	51.0 51.0	54.1 13:33:58	60.9	54.1 54.1	49.4	13:40:29	48.2	49.4	49.4
50.0	13:19:36	62.1	50.0 50.0	53.0 13:33:59	60.9	53.0 53.0	52.5	13:40:30	48.1	52.5	52.5
50.0	13:19:37	62.0	50.0 50.0	51.9 13:34:00	60.9	51.9 51.9	52.3	13:40:31	48.1	52.3	52.3
49.9	13:19:38	62.0	49.9 49.9	52.3 13:34:01	60.9	52.3 52.3	51.5	13:40:32	48.1	51.5	51.5
49.7 50.1 49.7	13:19:40 13:19:41	62.0 62.1 62.1	49.7 49.7 50.1 50.1 49.7 49.7	51.4 13:34:02 52.4 13:34:03 53.2 13:34:04	60.9 60.9 60.9	51.4 51.4 52.4 52.4 53.2 53.2	48.7 46.0 48.0	13:40:33 13:40:34 13:40:35	48.0 47.6 47.4	48.7 46.0 48.0	48.7 46.0 48.0
49.8	13:19:42	62.1	49.8 49.8	54.0 13:34:05	60.9	54.0 54.0	46.9	13:40:36	47.3	46.9	46.9
49.4	13:19:43	62.1	49.4 49.4	52.8 13:34:06	60.9	52.8 52.8	46.4	13:40:37	47.2	46.4	46.4
48.3	13:19:44	62.1	48.3 48.3	51.6 13:34:07	60.9	51.6 51.6	45.6	13:40:38	47.1	45.6	45.6
48.1	13:19:45	62.1	48.1 48.1	51.3 13:34:08	60.9	51.3 51.3	44.3	13:40:39	46.9	44.3	44.3
48.6	13:19:46	62.1	48.6 48.6	52.5 13:34:09	60.9	52.5 52.5	42.3	13:40:40	46.9	42.3	42.3
50.8	13:19:47	62.1	50.8 50.8	51.9 13:34:10	60.9	51.9 51.9	40.5	13:40:41	46.9	40.5	40.5
53.0	13:19:48	62.1	53.0 53.0	52.6 13:34:11	60.9	52.6 52.6	40.0	13:40:42	46.9	40.0	40.0
55.0	13:19:49	62.1	55.0 55.0	53.6 13:34:12	60.9	53.6 53.6	41.0	13:40:43	46.9	41.0	41.0
60.1	13:19:50	62.1	60.1 60.1	53.5 13:34:13	60.9	53.5 53.5	40.9	13:40:44	46.9	40.9	40.9
68.2	13:19:51	62.1	68.2 68.2	53.6 13:34:14	60.9	53.6 53.6	41.4	13:40:45	46.9	41.4	41.4
71.3	13:19:52	62.0	71.3 71.3	52.6 13:34:15	60.9	52.6 52.6	43.5	13:40:46	46.9	43.5	43.5
69.5	13:19:53	62.0	69.5 69.5	52.9 13:34:16	60.9	52.9 52.9	44.7	13:40:47	46.9	44.7	44.7
66.2	13:19:54	62.0	66.2 66.2	54.5 13:34:17	60.9	54.5 54.5	47.4	13:40:48	46.9	47.4	47.4

APPENDIX C

RCNM Model Construction Noise Calculations

Report date: 5/17/2021

Case Description: Brawley Solar Facility - Site Preparation

---- Receptor #1 ----

Baselines (dBA)

Description Land Use Daytime Evening Night
Nearest Home to Northwest Residential 66.5 66.5 64.9

Equipment									
	;	Spec	Actual	Receptor	Estimated				
Impact	ļ	Lmax	Lmax	Distance	Shielding				
Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)				
No	20		79.1	2900	0				
No	20		79.1	2900	0				
No	40		80.7	2900	0				
No	40		80.7	2900	0				
No	40		81.7	2900	0				
No	40		81.7	2900	0				
No	40		81.7	2900	0				
No	40	84		2900	0				
No	40		79.1	2900	0				
No	40		77.6	2900	0				
No	40	84		2900	0				
	Device No	Impact Usage(%) (No 20 No 20 No 40	Spec Impact Lmax	Impact Device Usage(%) (dBA) (dBA) Lmax (dBA) No 20 79.1 No 20 79.1 No 40 80.7 No 40 80.7 No 40 81.7 No 40 81.7 No 40 81.7 No 40 84 No 40 79.1 No 40 77.6	Impact Device Double Spec Lmax Lmax Lmax Lmax Lmax Distance Distance (feet) No 20 79.1 2900 79.1 2900 No 40 80.7 2900 80.7 2900 No 40 80.7 2900 80.7 2900 No 40 81.7 2900 81.7 2900 No 40 81.7 2900 81.7 2900 No 40 81.7 2900 80.7 2900 No 40 79.1 2900 81.7 2900 No 40 84 2900 79.1 2900 No 40 77.6 2900				

Results Calculated (dBA) Noise Limits (dBA) Day Evening Equipment *Lmax Leq Lmax Leq Lmax Leq **Drill Rig Truck** 43.9 36.9 N/A N/A N/A N/A **Drill Rig Truck** 43.9 36.9 N/A N/A N/A N/A Excavator 45.4 41.5 N/A N/A N/A N/A Excavator 45.4 41.5 N/A N/A N/A N/A 46.4 42.4 Dozer N/A N/A N/A N/A Dozer 46.4 42.4 N/A N/A N/A N/A Dozer 46.4 42.4 N/A N/A N/A N/A Tractor 48.7 44.8 N/A N/A N/A N/A Front End Loader 39.9 43.8 N/A N/A N/A N/A Backhoe 42.3 38.3 N/A N/A N/A N/A Tractor 48.7 44.8 N/A N/A N/A N/A Total 49 52 N/A N/A N/A N/A

^{*}Calculated Lmax is the Loudest value.

Report date: 5/17/2021

Case Description: Brawley Solar Facility - Site Preparation

---- Receptor #2 ----

Baselines (dBA)

Description Land Use Daytime Evening Night
Nearest Home to Northeast Residential 60.2 60.2 55.6

• •									
		Spec	Actual	Receptor	Estimated				
Impact		Lmax	Lmax	Distance	Shielding				
Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)				
No	20		79.1	2900	0				
No	20		79.1	2900	0				
No	40		80.7	2900	0				
No	40		80.7	2900	0				
No	40		81.7	2900	0				
No	40		81.7	2900	0				
No	40		81.7	2900	0				
No	40	84		2900	0				
No	40		79.1	2900	0				
No	40		77.6	2900	0				
No	40.0	84		2900	0				
	Device No	Device Usage(%) No 20 No 40 No 40	Spec Impact	Impact Device Device Double Lmax Usage(%) (dBA) Lmax (dBA) No 20 79.1 No 20 79.1 No 40 80.7 No 40 81.7 No 40 81.7 No 40 81.7 No 40 84 No 40 79.1 No 40 77.6	Impact Device Double Usage(%) (dBA) (dBA) (dBA) (dBA) (feet) Distance (feet) No 20 79.1 2900 No 20 79.1 2900 No 40 80.7 2900 No 40 80.7 2900 No 40 81.7 2900 No 40 81.7 2900 No 40 81.7 2900 No 40 84 2900 No 40 79.1 2900 No 40 79.1 2900 No 40 77.6 2900				

Results

		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Drill Rig Truck		43.9	36.9	N/A	N/A	N/A	N/A
Drill Rig Truck		43.9	36.9	N/A	N/A	N/A	N/A
Excavator		45.4	41.5	N/A	N/A	N/A	N/A
Excavator		45.4	41.5	N/A	N/A	N/A	N/A
Dozer		46.4	42.4	N/A	N/A	N/A	N/A
Dozer		46.4	42.4	N/A	N/A	N/A	N/A
Dozer		46.4	42.4	N/A	N/A	N/A	N/A
Tractor		48.7	44.8	N/A	N/A	N/A	N/A
Front End Loader		43.8	39.9	N/A	N/A	N/A	N/A
Backhoe		42.3	38.3	N/A	N/A	N/A	N/A
Tractor		48.7	44.8	N/A	N/A	N/A	N/A
	Total	49	52	N/A	N/A	N/A	N/A

^{*}Calculated Lmax is the Loudest value.

Report date: 5/17/2021

Case Description: Brawley Solar Facility - Site Preparation

---- Receptor #3 ----

Baselines (dBA)

Description Land Use Daytime Evening Night
Nearest Home to Southeast Residential 62.0 62.0 56.2

	Equipment							
		Spec	c Actual	Receptor	Estimated			
	Impact	Lma	x Lmax	Distance	Shielding			
Description	Device	Usage(%) (dBA	A) (dBA)	(feet)	(dBA)			
Drill Rig Truck	No	20	79.1	2850	0			
Drill Rig Truck	No	20	79.1	2850	0			
Excavator	No	40	80.7	2850	0			
Excavator	No	40	80.7	2850	0			
Dozer	No	40	81.7	2850	0			
Dozer	No	40	81.7	2850	0			
Dozer	No	40	81.7	2850	0			
Tractor	No	40 8	34	2850	0			
Front End Loader	No	40	79.1	2850	0			
Backhoe	No	40	77.6	2850	0			
Tractor	No	40 8	34	2850	0			

	Results							
	Calculate	d (dBA)	Noise Limits		(dBA)			
			Day		Evening			
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq		
Drill Rig Truck	44.0	37.0	N/A	N/A	N/A	N/A		
Drill Rig Truck	44.0	37.0	N/A	N/A	N/A	N/A		
Excavator	45.6	41.6	N/A	N/A	N/A	N/A		
Excavator	45.6	41.6	N/A	N/A	N/A	N/A		
Dozer	46.6	42.6	N/A	N/A	N/A	N/A		
Dozer	46.6	42.6	N/A	N/A	N/A	N/A		
Dozer	46.6	42.6	N/A	N/A	N/A	N/A		
Tractor	48.9	44.9	N/A	N/A	N/A	N/A		
Front End Loader	44.0	40.0	N/A	N/A	N/A	N/A		
Backhoe	42.4	38.5	N/A	N/A	N/A	N/A		
Tractor	48.9	44.9	N/A	N/A	N/A	N/A		

49

Total

N/A

N/A

N/A

N/A

52

^{*}Calculated Lmax is the Loudest value.

Report date: 5/17/2021

Case Description: Brawley Solar Facility - PV System Installation & Testing

---- Receptor #1 ----

	Baselines (dBA)				
Description	Land Use	Daytime	Evening	Night	
Nearest Home to Northwest	Residential	66.5	66.5	64.9	

			Equipmer	nt		
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Man Lift	No	20		74.7	2900	0
Man Lift	No	20		74.7	2900	0
Compressor (air)	No	40		77.7	2900	0
Crane	No	16		80.6	2900	0
Crane	No	16		80.6	2900	0
Gradall	No	40		83.4	2900	0
Gradall	No	40		83.4	2900	0
Gradall	No	40		83.4	2900	0
Generator	No	50		80.6	2900	0
Grader	No	40	85		2900	0
Flat Bed Truck	No	40		74.3	2900	0
Flat Bed Truck	No	40		74.3	2900	0
Tractor	No	40.0	84		2900	0
Front End Loader	No	40		79.1	2900	0
Backhoe	No	40		77.6	2900	0
Welder / Torch	No	40		74	2900	0

		Results						
		Calculate	d (dBA)	Noise Limits (dBA)				
				Day		Evening		
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	
Man Lift		39.4	32.4	N/A	N/A	N/A	N/A	
Man Lift		39.4	32.4	N/A	N/A	N/A	N/A	
Compressor (air)		42.4	38.4	N/A	N/A	N/A	N/A	
Crane		45.3	37.3	N/A	N/A	N/A	N/A	
Crane		45.3	37.3	N/A	N/A	N/A	N/A	
Gradall		48.1	44.2	N/A	N/A	N/A	N/A	
Gradall		48.1	44.2	N/A	N/A	N/A	N/A	
Gradall		48.1	44.2	N/A	N/A	N/A	N/A	
Generator		45.4	42.4	N/A	N/A	N/A	N/A	
Grader		49.7	45.8	N/A	N/A	N/A	N/A	
Flat Bed Truck		39.0	35.0	N/A	N/A	N/A	N/A	
Flat Bed Truck		39.0	35.0	N/A	N/A	N/A	N/A	
Tractor		48.7	44.8	N/A	N/A	N/A	N/A	
Front End Loader		43.8	39.9	N/A	N/A	N/A	N/A	
Backhoe		42.3	38.3	N/A	N/A	N/A	N/A	
Welder / Torch		38.7	34.8	N/A	N/A	N/A	N/A	
	Total	50	53	N/A	N/A	N/A	N/A	

^{*}Calculated Lmax is the Loudest value.

Report date: 5/17/2021

Case Description: Brawley Solar Facility - PV System Installation & Testing

---- Receptor #2 ----

Baselines	

Description Land Use Daytime Evening Night
Nearest Home to Northeast Residential 60.2 60.2 55.6

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Man Lift	No	20		74.7	2900	0
Man Lift	No	20		74.7	2900	0
Compressor (air)	No	40		77.7	2900	0
Crane	No	16		80.6	2900	0
Crane	No	16		80.6	2900	0
Gradall	No	40		83.4	2900	0
Gradall	No	40		83.4	2900	0
Gradall	No	40		83.4	2900	0
Generator	No	50		80.6	2900	0
Grader	No	40	85		2900	0
Flat Bed Truck	No	40		74.3	2900	0
Flat Bed Truck	No	40		74.3	2900	0
Tractor	No	40	84		2900	0
Front End Loader	No	40		79.1	2900	0
Backhoe	No	40		77.6	2900	0
Welder / Torch	No	40		74	2900	0

		Calculated (dBA)			Noise Limits (dBA)		
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Man Lift		39.4	32.4	N/A	N/A	N/A	N/A
Man Lift		39.4	32.4	N/A	N/A	N/A	N/A
Compressor (air)		42.4	38.4	N/A	N/A	N/A	N/A
Crane		45.3	37.3	N/A	N/A	N/A	N/A
Crane		45.3	37.3	N/A	N/A	N/A	N/A
Gradall		48.1	44.2	N/A	N/A	N/A	N/A
Gradall		48.1	44.2	N/A	N/A	N/A	N/A
Gradall		48.1	44.2	N/A	N/A	N/A	N/A
Generator		45.4	42.4	N/A	N/A	N/A	N/A
Grader		49.7	45.8	N/A	N/A	N/A	N/A
Flat Bed Truck		39.0	35.0	N/A	N/A	N/A	N/A
Flat Bed Truck		39.0	35.0	N/A	N/A	N/A	N/A
Tractor		48.7	44.8	N/A	N/A	N/A	N/A
Front End Loader		43.8	39.9	N/A	N/A	N/A	N/A
Backhoe		42.3	38.3	N/A	N/A	N/A	N/A
Welder / Torch		38.7	34.8	N/A	N/A	N/A	N/A
	Total	50	53	N/A	N/A	N/A	N/A

^{*}Calculated Lmax is the Loudest value.

Report date: 5/17/2021

Case Description: Brawley Solar Facility - PV System Installation & Testing

---- Receptor #3 ----

Baselines (dBA)						
Description	Land Use	Daytime	Evening	Night		
Nearest Home to Southeast	Residential	62.0	62.0	56.2		

			Equipmer	ıt			
			Spec	Actual	Receptor	Estimated	
	Impact		Lmax	Lmax	Distance	Shielding	
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)	
Man Lift	No	20		74.7	2850	0	
Man Lift	No	20		74.7	2850	0	
Compressor (air)	No	40		77.7	2850	0	
Crane	No	16		80.6	2850	0	
Crane	No	16		80.6	2850	0	
Gradall	No	40		83.4	2850	0	
Gradall	No	40		83.4	2850	0	
Gradall	No	40		83.4	2850	0	
Generator	No	50		80.6	2850	0	
Grader	No	40	85		2850	0	
Flat Bed Truck	No	40		74.3	2850	0	
Flat Bed Truck	No	40		74.3	2850	0	
Tractor	No	40	84		2850	0	
Front End Loader	No	40		79.1	2850	0	
Backhoe	No	40		77.6	2850	0	
Welder / Torch	No	40		74	2850	0	

				Results			
		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Man Lift		39.6	32.6	N/A	N/A	N/A	N/A
Man Lift		39.6	32.6	N/A	N/A	N/A	N/A
Compressor (air)		42.6	38.6	N/A	N/A	N/A	N/A
Crane		45.4	37.5	N/A	N/A	N/A	N/A
Crane		45.4	37.5	N/A	N/A	N/A	N/A
Gradall		48.3	44.3	N/A	N/A	N/A	N/A
Gradall		48.3	44.3	N/A	N/A	N/A	N/A
Gradall		48.3	44.3	N/A	N/A	N/A	N/A
Generator		45.5	42.5	N/A	N/A	N/A	N/A
Grader		49.9	45.9	N/A	N/A	N/A	N/A
Flat Bed Truck		39.1	35.2	N/A	N/A	N/A	N/A
Flat Bed Truck		39.1	35.2	N/A	N/A	N/A	N/A
Tractor		48.9	44.9	N/A	N/A	N/A	N/A
Front End Loader		44.0	40.0	N/A	N/A	N/A	N/A
Backhoe		42.4	38.5	N/A	N/A	N/A	N/A
Welder / Torch		38.9	34.9	N/A	N/A	N/A	N/A
	Total	50	53	N/A	N/A	N/A	N/A

^{*}Calculated Lmax is the Loudest value.

Report date: 5/17/2021

Case Description: Brawley Solar Facility - Site cleanup & Restoration

---- Receptor #1 ----

Baselines (dBA)

Description Land Use Daytime Evening Night
Nearest Home to Northwest Residential 66.5 66.5 64.9

Equipment			
Spec	Actual	Receptor	Estimated
Lmax	Lmax	Distance	Shielding
(dBA)	(dBA)	(feet)	(dBA)
85		2900	0
85		2900	0
	81.7	2900	0
	81.7	2900	0
	79.1	2900	0
	79.1	2900	0
84		2900	0
	77.6	2900	0
	Spec Lmax (dBA) 85 85	Spec Actual Lmax (dBA) (dBA) 85 85 81.7 79.1 79.1 84	Spec Actual Receptor Lmax Distance (dBA) (dBA) (feet) 85 2900 85 2900 81.7 2900 81.7 2900 79.1 2900 79.1 2900 84 2900

				Results			
		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader		49.7	45.8	N/A	N/A	N/A	N/A
Grader		49.7	45.8	N/A	N/A	N/A	N/A
Dozer		46	42	N/A	N/A	N/A	N/A
Dozer		46.4	42.4	N/A	N/A	N/A	N/A
Front End Loader		43.8	39.9	N/A	N/A	N/A	N/A
Front End Loader		43.8	39.9	N/A	N/A	N/A	N/A
Tractor		48.7	44.8	N/A	N/A	N/A	N/A
Backhoe		42.3	38.3	N/A	N/A	N/A	N/A
	Total	50	52	N/A	N/A	N/A	N/A

^{*}Calculated Lmax is the Loudest value.

Report date: 5/17/2021

Case Description: Brawley Solar Facility - Site cleanup & Restoration

---- Receptor #2 ----

Baselines (dBA)

Description Land Use Daytime Evening Night

Nearest Home to Northeast Residential 60 60 55.6

			Equipme	ent		
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Grader	No	40		85	2900	0
Grader	No	40		85	2900	0
Dozer	No	40		81.7	2900	0
Dozer	No	40		81.7	2900	0
Front End Loader	No	40.0		79.1	2900	0
Front End Loader	No	40.0		79.1	2900	0
Tractor	No	40.0	84		2900	0
Backhoe	No	40.0		77.6	2900	0

Results

		Calculated (dBA)			Noise Limits (dBA)		
			, ,	Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader		49.7	45.8	N/A	N/A	N/A	N/A
Grader		49.7	45.8	N/A	N/A	N/A	N/A
Dozer		46.4	42.4	N/A	N/A	N/A	N/A
Dozer		46.4	42.4	N/A	N/A	N/A	N/A
Front End Loader		43.8	39.9	N/A	N/A	N/A	N/A
Front End Loader		43.8	39.9	N/A	N/A	N/A	N/A
Tractor		48.7	44.8	N/A	N/A	N/A	N/A
Backhoe		42.3	38.3	N/A	N/A	N/A	N/A
	Total	50	52	N/A	N/A	N/A	N/A

^{*}Calculated Lmax is the Loudest value.

Report date: 5/17/2021

Case Description: Brawley Solar Facility - Site cleanup & Restoration

---- Receptor #3 ----

_		/ ·- · ·
B acal	inac	$(A \square A)$
Dase	111162	(dBA)

Description Land Use Daytime Evening Night Nearest Home to Southeast Residential 62.0 62.0 56.2

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Grader	No	40	85		2850	0
Grader	No	40	85		2850	0
Dozer	No	40		81.7	2850	0
Dozer	No	40		81.7	2850	0
Front End Loader	No	40		79.1	2850	0
Front End Loader	No	40		79.1	2850	0
Tractor	No	40	84		2850	0
Backhoe	No	40		77.6	2850	0

Results

		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader		49.9	45.9	N/A	N/A	N/A	N/A
Grader		49.9	45.9	N/A	N/A	N/A	N/A
Dozer		46.6	42.6	N/A	N/A	N/A	N/A
Dozer		46.6	42.6	N/A	N/A	N/A	N/A
Front End Loader		44.0	40.0	N/A	N/A	N/A	N/A
Front End Loader		44.0	40.0	N/A	N/A	N/A	N/A
Tractor		48.9	44.9	N/A	N/A	N/A	N/A
Backhoe		42.4	38.5	N/A	N/A	N/A	N/A
	Total	50	52	N/A	N/A	N/A	N/A

^{*}Calculated Lmax is the Loudest value.